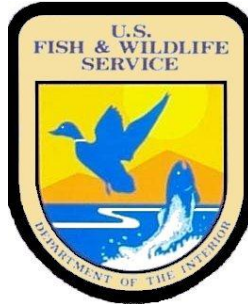


The Road Inventory of Hakalau Forest National Wildlife Refuge Hilo, HI



Prepared By:
Federal Highway Administration
Central Federal Lands Highway Division
April 2013



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INTRODUCTION

The Transportation Equity Act for the 21st Century (Public Law 105-178) created the Refuge Roads Program. Refuge roads are those public roads that provide access to or within a unit of the National Wildlife Refuge System and for which title and maintenance responsibility is vested in the United States Government. Funds from the Highway Trust Fund are available for refuge roads and can be used by the station to pay the cost of:

- (a) Maintenance and improvements of refuge roads.
- (b) Maintenance and improvements of:
 - (1) Adjacent vehicle parking areas
 - (2) Provision for pedestrians and bicycles and
 - (3) Construction and reconstruction of roadside rest areas that are located in or adjacent to wildlife refuges
- (c) Administrative costs associated with such maintenance and improvements.

The funds available for refuge roads are to be disbursed based on the relative needs of the various refuges in the National Wildlife Refuge System, and taking into consideration:

- (a) The comprehensive conservation plan for each refuge;
- (b) The need for access as identified through land use planning; and
- (c) The impact of land use planning on existing transportation facilities.

To determine the relative needs of the U.S. Fish and Wildlife Service, the Federal Highway Administration (FHWA) was asked to inventory all public access roads and parking lots and provide a condition assessment of each. In 2008 the inventory was expanded to include administrative (service use only) roads and parking lots. An FHWA representative meets with refuge personnel to identify route segments and assign route numbers and functional classifications (See Appendix) for each route. All roads and parking lots are mapped using Trimble GPS units and visually assessed for condition using the RSL method of evaluation developed at Utah State University (See Appendix). Culverts, Gates, Guardrails and Low Water Crossings are also mapped and inspected for any obvious defects.

An estimate is provided, in year 2008 dollars, based on the condition determined by the rating system. Estimates are based upon data and location factors from the 2008 RS Means Heavy Construction Cost Data 22nd Annual Edition. Cost estimates should be evaluated on a case-by-case basis when being used for programming purposes.

Native Surfaced roads and parking lots already inventoried will not be re-inventoried and will not appear individually in report chapters 5, 6 and 8. Mileages and areas of native surfaced roads and parking lots will still appear in all summaries in the report and will remain in the road inventory database. In addition to this report, the FHWA will furnish the condition ratings of each route and segment to the Fish and Wildlife Service in a Microsoft Access database so the data can be included in their Real Property Inventory.

Hakalau Forest NWR Summaries

Route Miles and Percentages by Functional Class and Condition

Condition Rating (Based on RSL)*

F. C.	Excellent		Good		Fair		Poor		Failed		TOTAL MILES
	MILES	%	MILES	%	MILES	%	MILES	%	MILES	%	
I	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
II	0.00	0.0%	2.99	64.3%	1.66	35.7%	0.00	0.0%	0.00	0.0%	4.65
III	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
IV	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
V	0.00	0.0%	12.63	30.5%	20.38	49.3%	8.06	19.5%	0.28	0.7%	41.35
Totals	0.00	0.0%	15.62	34.0%	22.04	47.9%	8.06	17.5%	0.28	0.6%	46.00

*For a description of condition ratings for the various surface types see the Appendix.

Route Miles and Percentages by Surface Type and Condition

Paved Condition Rating [Condition(RSL)]

Surface	Excellent		Good		Fair		Poor		Failed		TOTAL MILES
	MILES	%	MILES	%	MILES	%	MILES	%	MILES	%	
AS	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
CO	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
Totals	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00

Unpaved Condition Rating [Condition(RSL)]

Surface	Excellent		Good		Fair		Poor		Failed		TOTAL MILES
	MILES	%	MILES	%	MILES	%	MILES	%	MILES	%	
GR	0.00	0.0%	2.24	38.8%	3.54	61.2%	0.00	0.0%	0.00	0.0%	5.78
NA	0.00	0.0%	13.38	40.1%	16.31	48.8%	3.43	10.3%	0.28	0.8%	33.40
PR	0.00	0.0%	0.00	0.0%	2.19	32.1%	4.63	67.9%	0.00	0.0%	6.82
Totals	0.00	0.0%	15.62	34.0%	22.04	47.9%	8.06	17.5%	0.28	0.6%	46.00

Square Footage (Parking Areas)

Condition Rating

Surface	Excellent		Good		Fair		Poor		Failed		Total SQ FT
	SQ FT	%	SQ FT	%	SQ FT	%	SQ FT	%	SQ FT	%	
AS	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
CO	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
GR	0	0.0%	13,613	45.3%	8,326	27.7%	8,121	27.0%	0	0.0%	30,060
NA	0	0.0%	2,764	26.8%	7,566	73.2%	0	0.0%	0	0.0%	10,330
PR	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
Totals	0	0.0%	16,377	40.5%	15,892	39.3%	8,121	20.1%	0	0.0%	40,390

Hakalau Forest NWR Summaries

Route Miles and Percentages by Use Type and Condition

Road Condition Rating: Public/Administrative Use

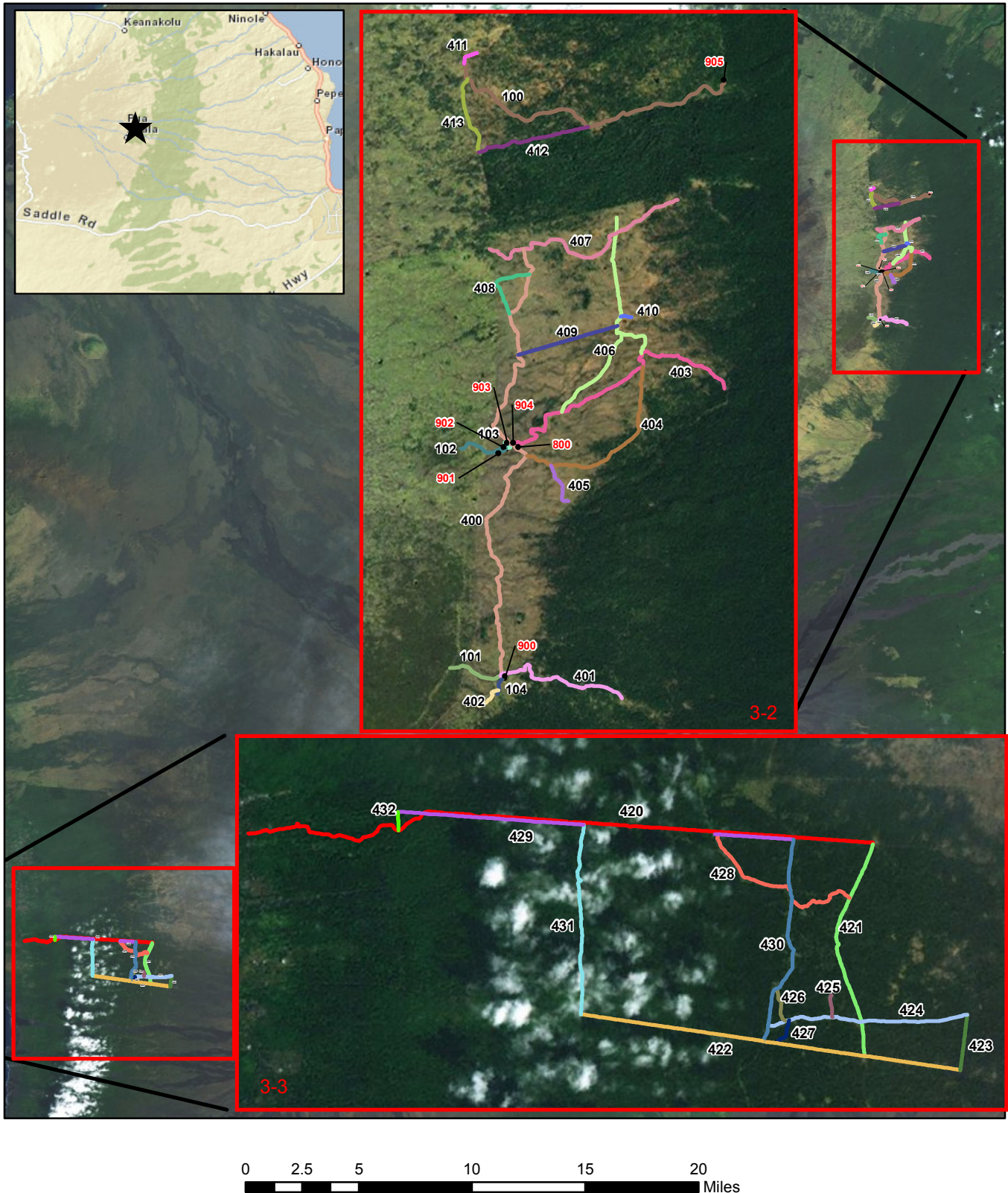
USE TYPE	Excellent		Good		Fair		Poor		Failed		TOTAL MILES
	MILES	%	MILES	%	MILES	%	MILES	%	MILES	%	
Public (FC I-III)	0.00	0.0%	2.99	64.3%	1.66	35.7%	0.00	0.0%	0.00	0.0%	4.65
Admin (FC IV-V)	0.00	0.0%	12.63	30.5%	20.38	49.3%	8.06	19.5%	0.28	0.7%	41.35
Totals	0.00	0.0%	15.62	34.0%	22.04	47.9%	8.06	17.5%	0.28	0.6%	46.00

Parking Condition Rating: Public/Administrative Use

USE TYPE	Excellent		Good		Fair		Poor		Failed		Total Sq Ft
	Sq Ft	%	Sq Ft	%	Sq Ft	%	Sq Ft	%	Sq Ft	%	
Public	0	0.0%	6292	20.8%	15892	52.4%	8121	26.8%	0	0.0%	30,305
Admin	0	0.0%	10085	100.0%	0	0.0%	0	0.0%	0	0.0%	10,085
Totals	0	0.0%	16,377	40.5%	15,892	39.3%	8,121	20.1%	0	0.0%	40,390

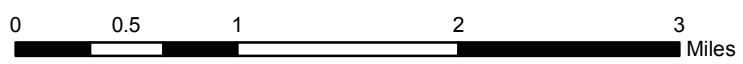
Hakalau Forest National Wildlife Refuge

ROUTE LOCATION MAP

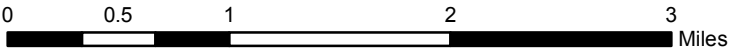


Hakalau Forest National Wildlife Refuge

ROUTE LOCATION MAP



Hakalau Forest National Wildlife Refuge
ROUTE LOCATION MAP



Hakalau Forest NWR - 12536

Route Identification List

Shading Color Key:

White = Paved Routes
Yellow = Unpaved Routes

RTE #	Asset Number	ROUTE NAME	RTE MI	ROUTE DESCRIPTION	PAVED MI	UN-PAVED MI	LANES	FC
100	10002394	Maulua Road	3.11	From Keanakolu Road to Miller Parking (Route 905)	-	3.11	1	2
101	10042056	Pua Akala Road	0.56	From Keanakolu Road to Pua Akala Parking (Route 900)	-	0.56	1	2
102	10002404	Hakalau Cabin/ Administration Access Road	0.61	From Keanakolu Road to end of loop	-	0.61	1	2
103	10042145	Greenhouse Loop	0.19	From Hakalau Cabin/ Administration Access Road (Route 102) to Housing Parking (Route 903)	-	0.19	1	2
104	10042102	Pua Akala Cabin Access Road	0.18	From Pua Akala Road (Route 101) to Cabin	-	0.18	1	2
400	10002383	Middle Road	4.79	From Nauhi Road (Route 407) to Pua Akala Service Road (Route 401)	-	4.79	1	5
401	10002395	Pua Akala Service Road	1.39	From Pua Akala Road (Route 101) to end of route	-	1.39	1	5
402	10002415	Nukupahu Road	0.28	From Pua Akala Cabin Access Road (Route 104) to obstacle	-	0.28	1	5
403	10002388	Pedro Road	2.85	From Greenhouse Loop (Route 103) to end of route	-	2.85	1	5
404	10002397	Hakalau Stream Road	1.86	From Middle Road (Route 400) to Pedro Road (Route 403)	-	1.86	1	5
405	10002411	Transect 7 Road	0.43	From Kakalau Stream Road (Route 404) to end of route	-	0.43	1	5
406	10002398	Frog Pond Road	2.53	From Pedro Road (Route 403) to Pedro Road (Route 403)	-	2.53	1	5
407	10002382	Nauhi Road	2.26	From Nauhi Creek to Refuge Boundary	-	2.26	1	5
408	10002403	Konohina Cutoff Road	0.65	From Middle Road (Route 400) to Middle Road (Route 400)	-	0.65	1	5
409	10002396	Alleyway Fenceline Road	0.97	From Middle Road (Route 400) to Frog Pond Road (Route 406)	-	0.97	2	5
410	10002396	Alleyway Road	0.11	From Frog Pond Road (Route 406) to end of route	-	0.11	1	5
411	-	Maulua Cabin Road	0.18	From Maulua Road (Route 100) to obstacle	-	0.18	2	5
412	10002409	Maulua-Piha Road	1.09	From West refuge boundary to Maulau Road (Route 100)	-	1.09	1	5
413	-	Upper Maulua Boundary Road	0.76	From Maulua Road (Route 100) to Maulua-Piha Road (Route 412)	-	0.76	1	5
420	10054816*	Kona Access Road	5.61	From Hawaii Belt Road to 5300ft Fenceline Road (Route 421)	-	5.61	1	5
421	10001953	5300ft Fenceline Road	1.93	From Kona Access Road (Route 420) to South Boundary Road (Route 422)	-	1.93	1	5
422	10001954	South Boundary Road	3.29	From East Boundary Road (Route 423) to 3600ft Fenceline Road (Route 431)	-	3.29	1	5
423	-	East Boundary Road	0.48	From South Boundary Road (Route 422) to Kalahiki Road (Route 424)	-	0.48	1	5
424	10001957	Kalahiki Road	1.74	From East Boundary Road (Route 423) to 4800ft Fenceline Road (Route 430)	-	1.74	1	5
425	10001971	Old Camp Road	0.19	From Kalahiki Road (Route 424) to old camp	-	0.19	1	5
426	10001958	Lava Tube Access Road	0.31	From 4800ft Fenceline Road (Route 430) to Kalahiki Road (Route 424)	-	0.31	1	5
427	10001969	Aviary Road	0.24	From Kalahiki Road (Route 424) to South Boundary Road (Route 422)	-	0.24	1	5

Hakalau Forest NWR - 12516

Route Identification List

Shading Color Key:

White = Paved Routes

Yellow = Unpaved Routes

RTE #	Asset Number	ROUTE NAME	RTE MI	ROUTE DESCRIPTION	PAVED MI	UN-PAVED MI	LANES	FC
428	10001956	Dog Leg Road	1.49	From 5300ft Fenceline Road (Route 421) to North Boundary Road (Route 429)	-	1.49	1	5
429	-	North Boundary Road	2.27	From 4800ft Fenceline Road (Route 430) to West Boundary Road (Route 432)	-	2.27	1	5
430	10001952	4800ft Fenceline Road	1.83	From North Boundary Road (Route 429) to South refuge boundary	-	1.83	1	5
431	-	3600ft Fenceline Road	1.66	From South refuge boundary to North Boundary Road (Route 429)	-	1.66	1	5
432	-	West Boundary Road	0.16	From North Boundary Road (Route 429) to Kona Access Road (Route 420)	-	0.16	1	5

Hakalau Forest NWR - 12536

Route Identification List (Parking)

Shading Color Key:

White = Paved Routes
Green = Unpaved Routes

Route #	Asset Number	ROUTE NAME	Area (Sq Ft)	ROUTE DESCRIPTION	Surface Type
800	-	Shop Parking	10,085	From Middle Road (Route 400)	Gravel
900	10042167	Pua Akala Parking	7,566	From Pua Akala Road (Route 101)	Native
901	10042168	Biological Field Unit Parking	1,461	From Hakalau Cabin/ Administration Access Road (Route 102)	Gravel
902	10042169	New Housing Parking	6,865	From Hakalau Cabin/ Administration Access Road (Route 102)	Gravel
903	10042170	Housing Parking	8,121	From Hakalau Cabin/ Administration Access Road (Route 102)	Gravel
904	10042171	Greenhouse Parking	3,528	From Middle Road (Route 400)	Gravel
905	10053544	Miller Parking	2,764	From Maulua Road (Route 100)	Native

CHANGES TO THE FISH AND WILDLIFE SERVICE ROAD INVENTORY REPORT

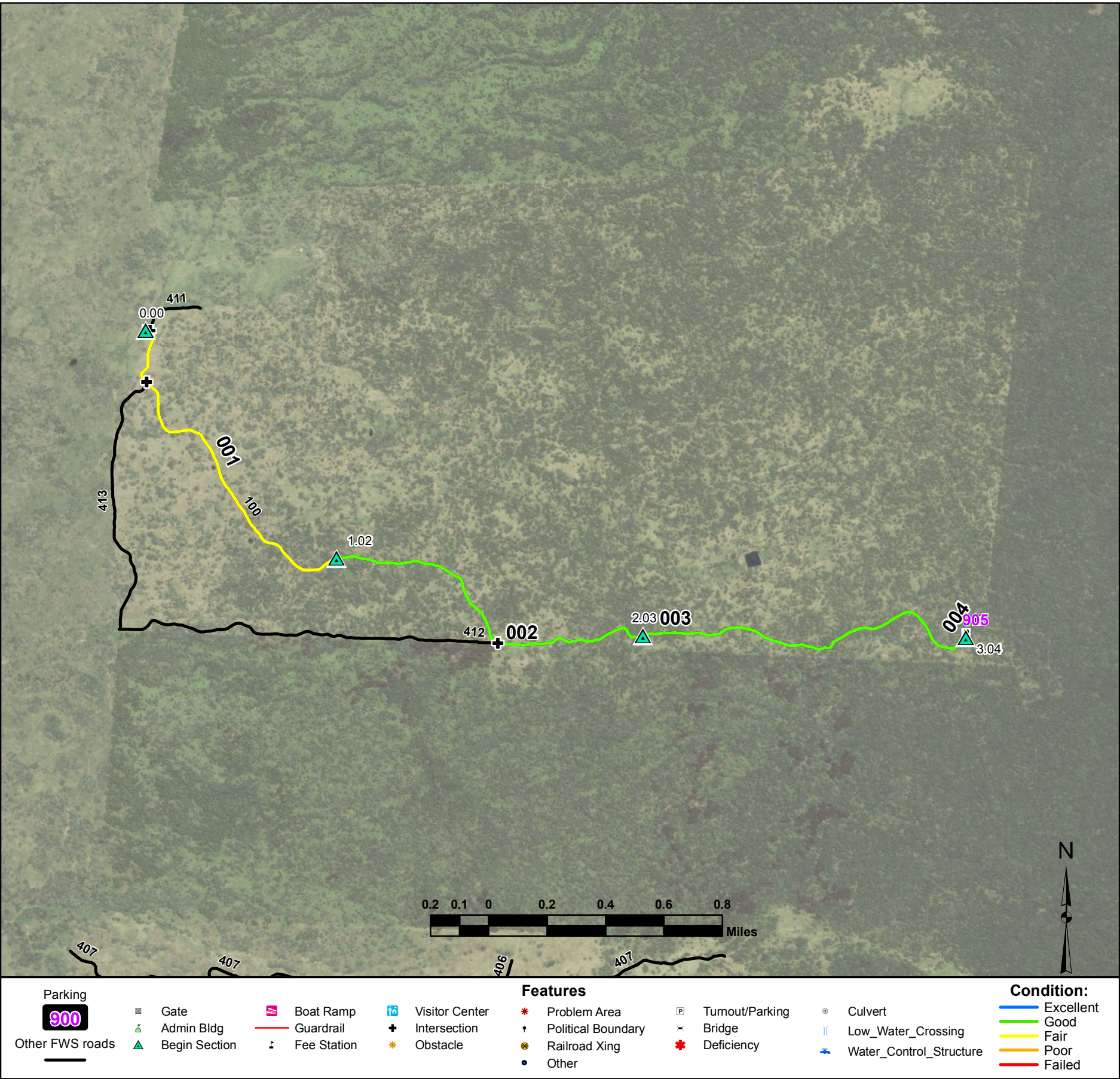
Hakalau Forest NWR

Routes added to previous inventory:		
Rte #	Rte Name	Reason For Addition
400	Middle Road	New Administrative Route
401	Pua Akala Service Road	New Administrative Route
402	Nukupahu Road	New Administrative Route
403	Pedro Road	New Administrative Route
404	Hakalau Stream Road	New Administrative Route
405	Transect 7 Road	New Administrative Route
406	Frog Pond Road	New Administrative Route
407	Nauhi Road	New Administrative Route
408	Konohina Cutoff Road	New Administrative Route
409	Alleyway Fenceline Road	New Administrative Route
410	Alleyway Road	New Administrative Route
411	Maulua Cabin Road	New Administrative Route
412	Maulua-Piha Road	New Administrative Route
413	Upper Maulua Boundary Road	New Administrative Route
420	Kona Access Road	New Administrative Route
421	5300 ft Fenceline Road	New Administrative Route
422	South Boundary Road	New Administrative Route
423	East Boundary Road	New Administrative Route
424	Kalahiki Road	New Administrative Route
425	Old Camp Road	New Administrative Route
426	Lava Tube Access Road	New Administrative Route
427	Aviary Road	New Administrative Route
428	Dog Leg Road	New Administrative Route
429	North Boundary Road	New Administrative Route
430	4800 ft Fenceline Road	New Administrative Route
431	3600 ft Fenceline Road	New Administrative Route
432	West Boundary Road	New Administrative Route
800	Shop Parking	New Administrative Route

Routes removed from previous inventory:		
Rte #	Rte Name	Reason For Removal

Routes modified from previous inventory:			
Rte #	Rte Name	Type of Modification	Description of Modification
101	Pua Akala Road	Geometry	
102	Hakalau Cabin/ Administration Access Road	Geometry and Name Change	
901	Biological Field Unit Parking	Geometry and Name Change	
902	New Housing Parking	Geometry	
903	Housing Parking	Geometry	
904	Greenhouse Parking	Geometry	
905	Miller Parking	Geometry and Surface Change	

Comments:



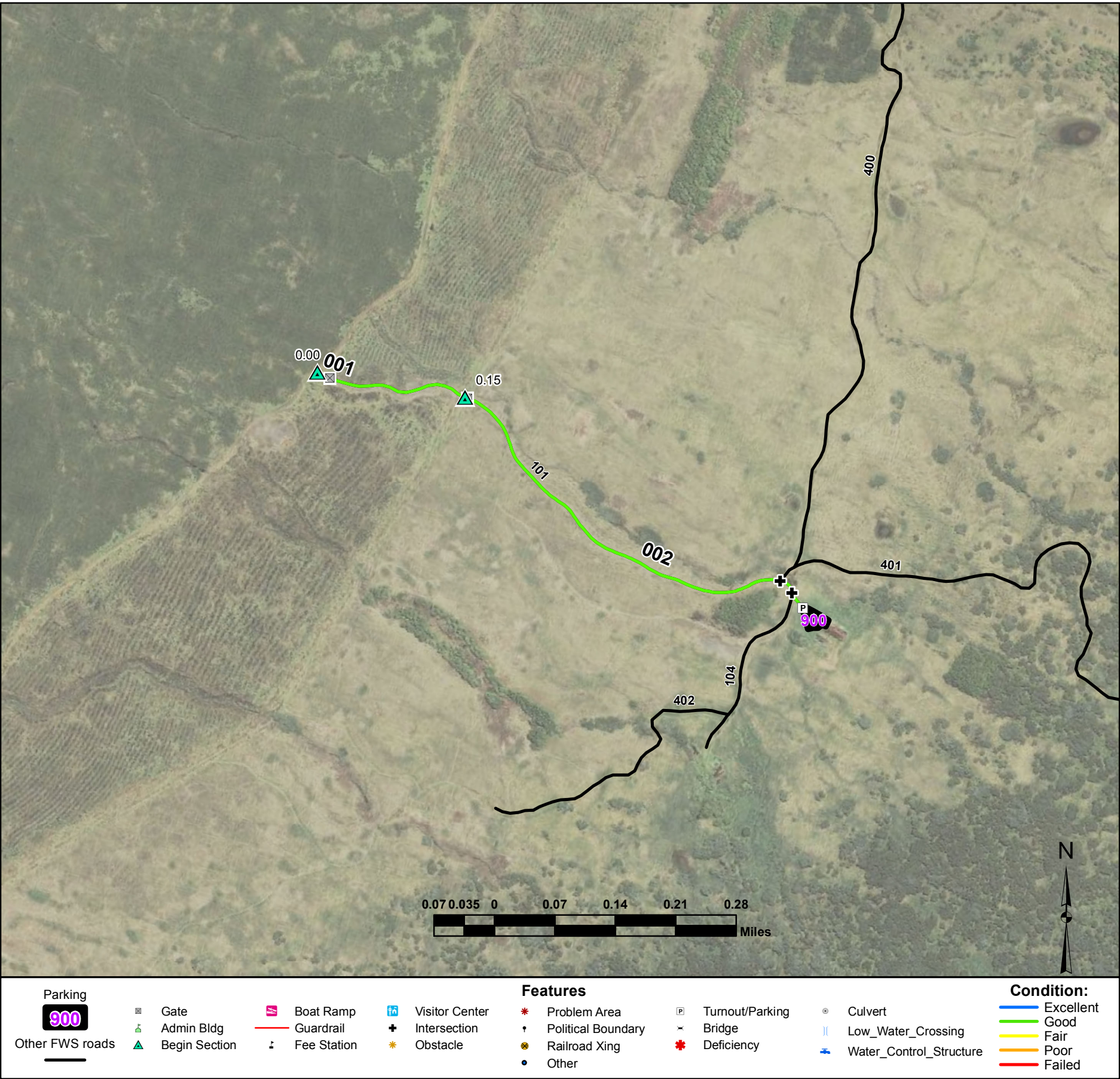
Maulua Road
From Keanakolu Road to Miller Parking (Route 905)

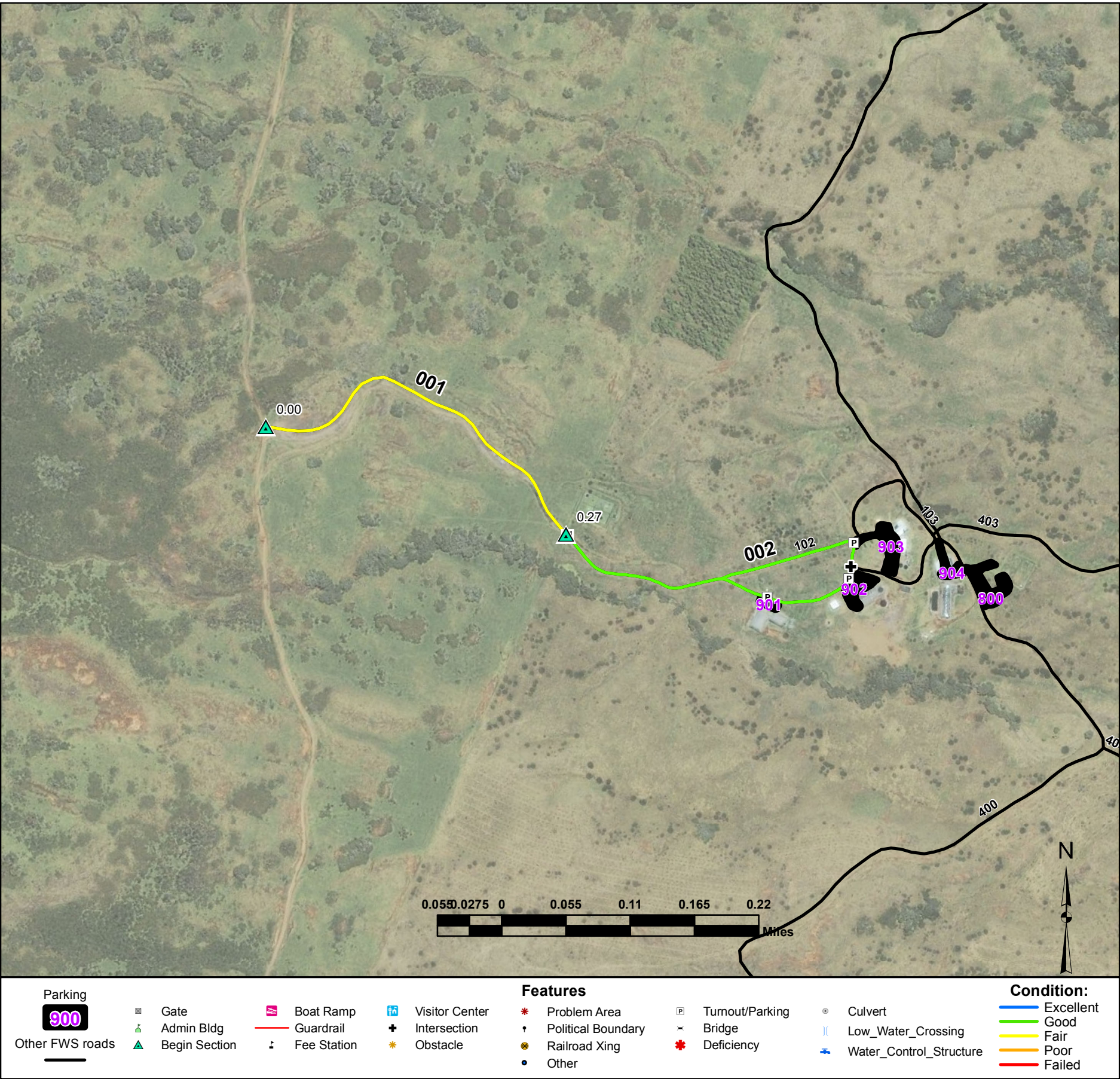
Route Number: 100

Total Route Mileage: 3.11

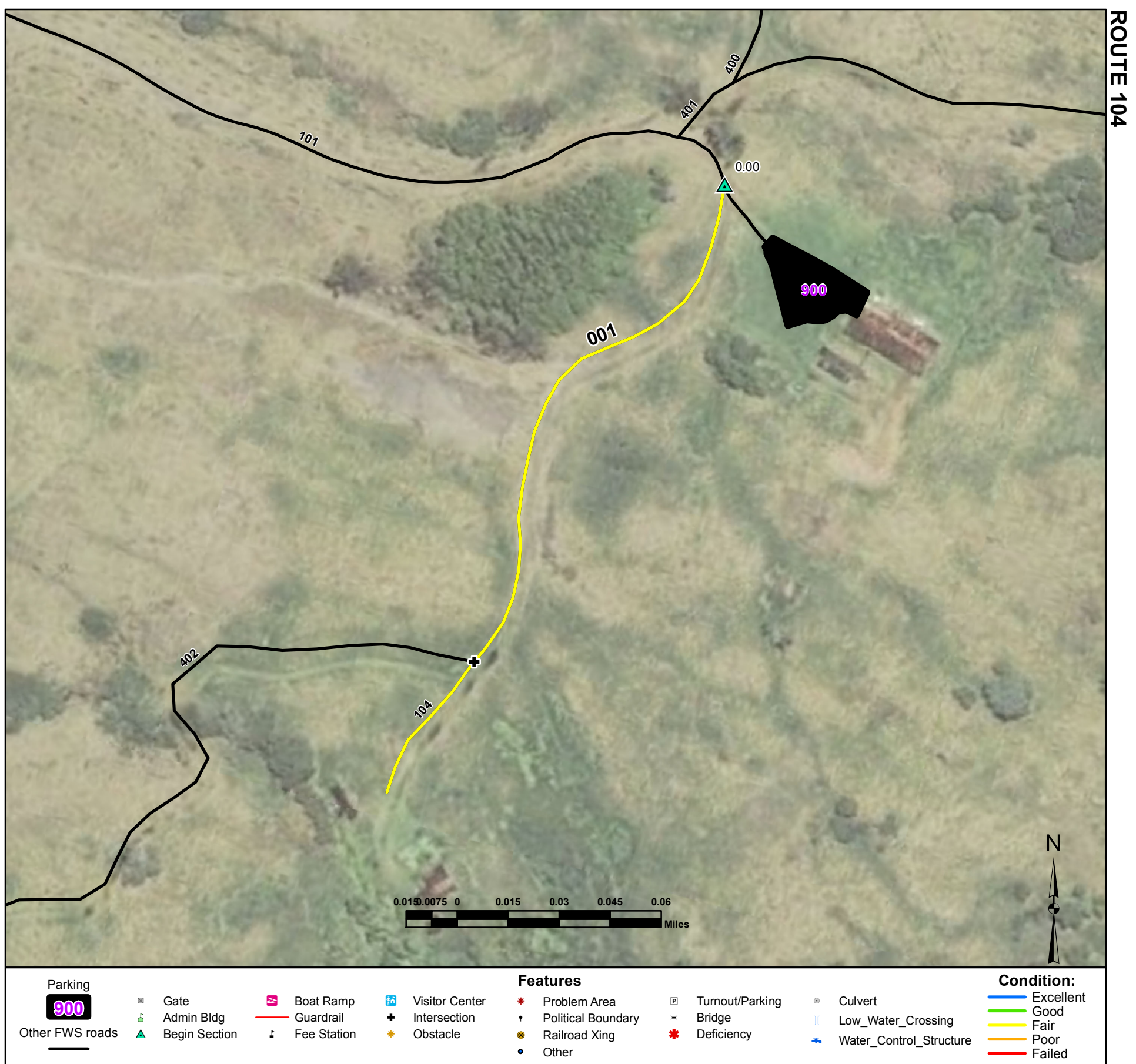
Asset Number	10002394	10002394	10002394	10002394	
Section Number	001	002	003	004	
Section Length (miles)	1.02	1.01	1.01	0.07	
Inspection Date	01-15-2013	01-15-2013	01-15-2013	01-15-2013	
Surface Type	Native	Native	Native	Native	
Number of Lanes	1	1	1	1	
Roadway Width (feet)	10	10	10	10	
Condition	Fair	Good	Good	Good	
Remaining Service Life (years)	3	7	5	5	
Estimated Cost to Repair	\$2,900	\$2,300	\$2,300	\$200	
Current Replacement Value	\$486,600	\$481,900	\$481,900	\$33,400	

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Gate	001-0.01						
Intersection	001-0.02						
Intersection	001-0.17						
Begin Section	002-1.02						
Intersection	002-1.6						
Begin Section	003-2.03						
Begin Section	004-3.04						
Turnout/Parking	004-3.05						
Turnout/Parking	004-3.1						









Pua Akala Cabin Access Road

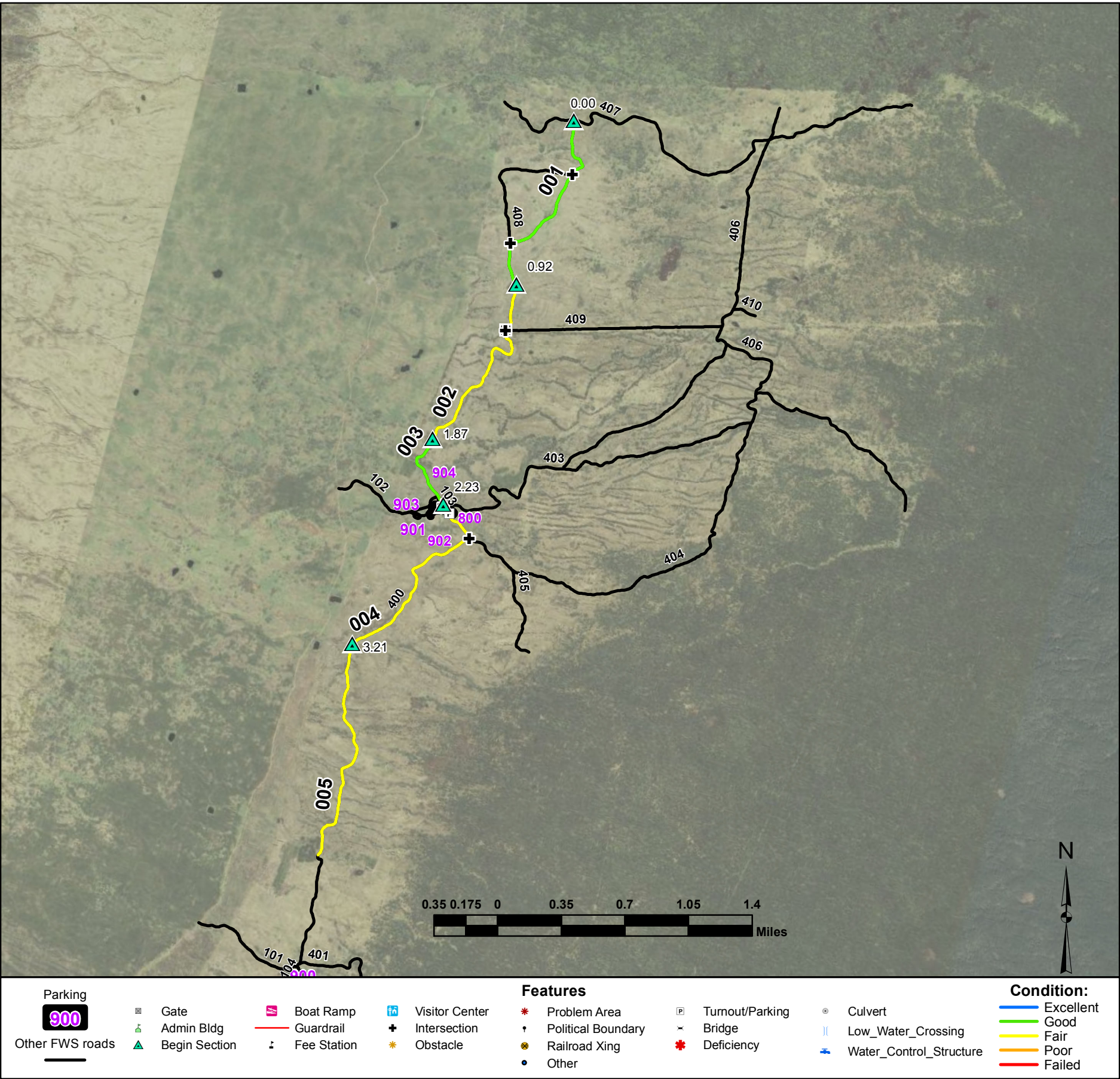
From Pua Akala Road (Route 101) to Cabin

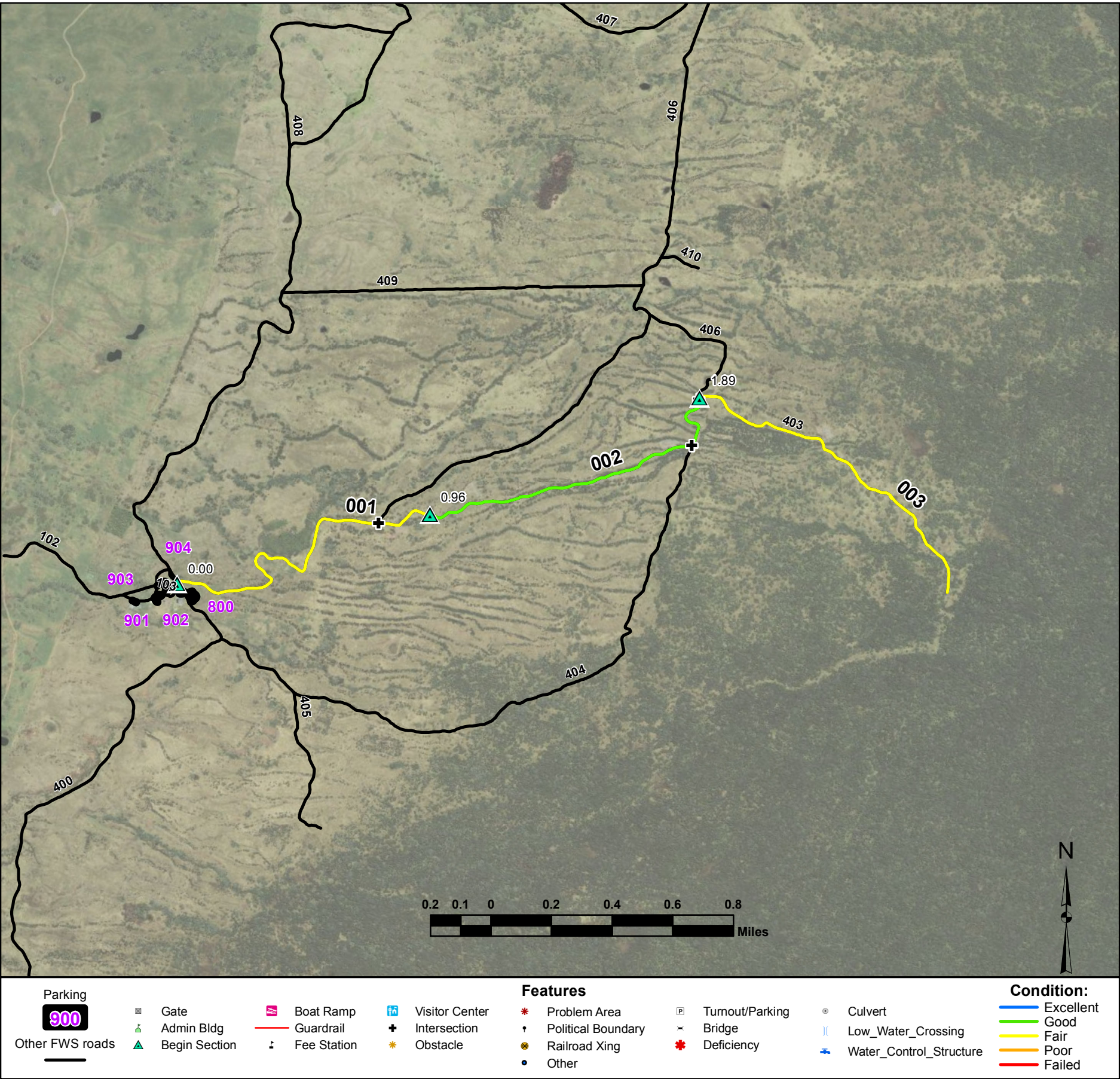
Route Number: 104

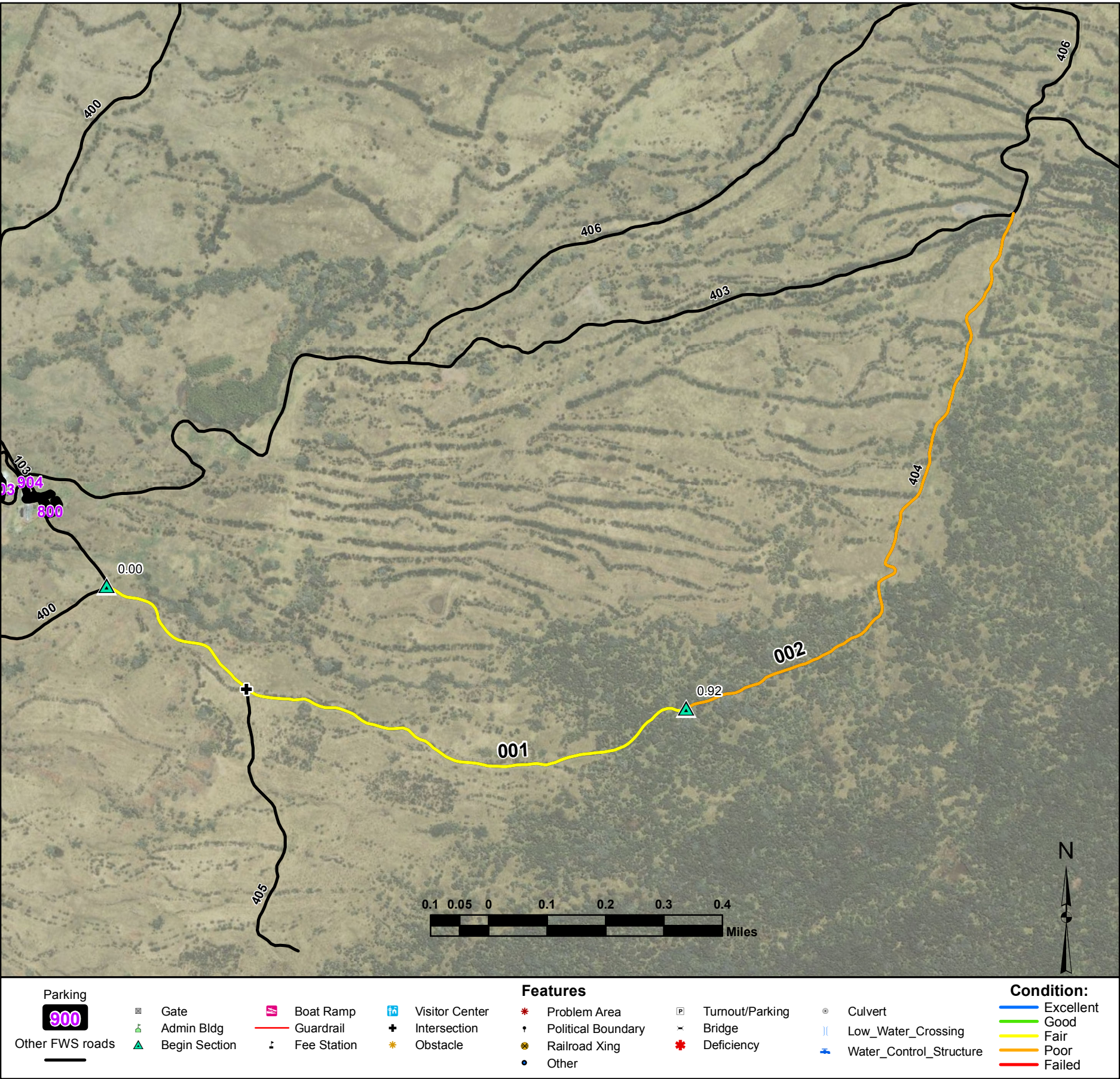
Total Route Mileage: 0.18

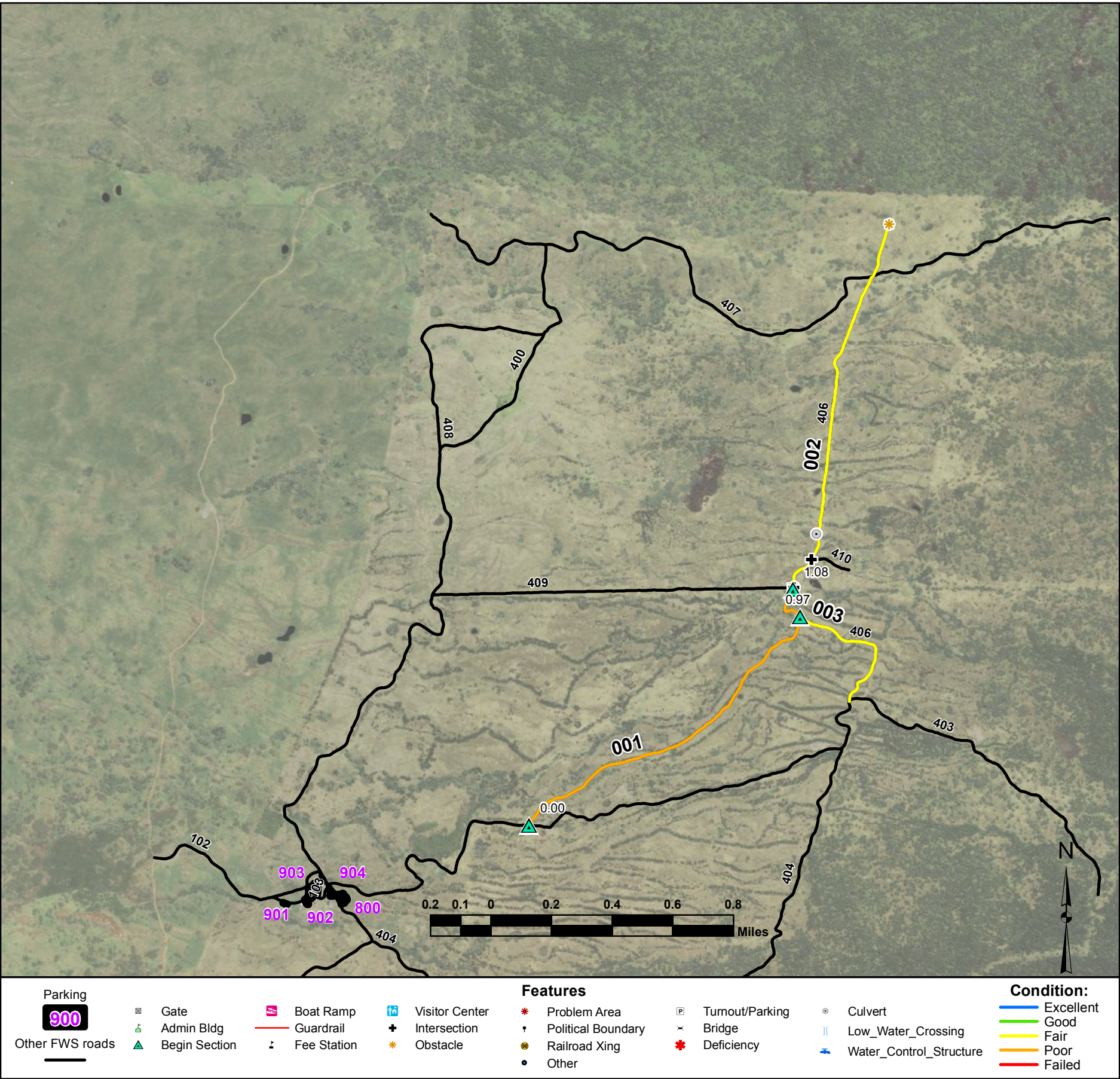
Asset Number	10042102				
Section Number	001				
Section Length (miles)	0.18				
Inspection Date	01-14-2013				
Surface Type	Gravel				
Number of Lanes	1				
Roadway Width (feet)	10				
Condition	Fair				
Remaining Service Life (years)	4				
Estimated Cost to Repair	\$900				
Current Replacement Value	\$166,000				

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section Intersection	001-0.0 001-0.14						









Frog Pond Road

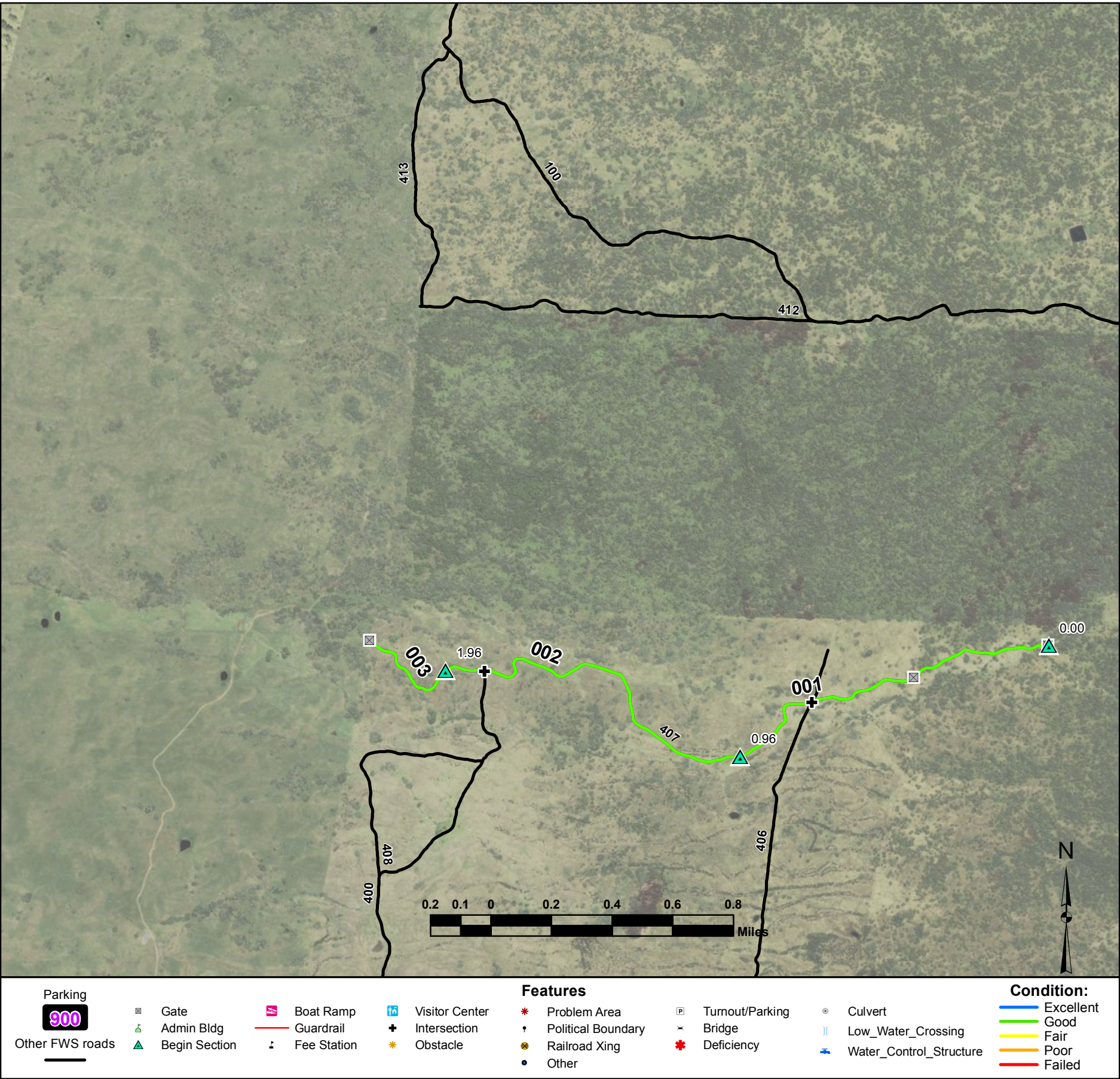
From Pedro Road (Route 403) to Pedro Road (Route 403)

Route Number: 406

Total Route Mileage: 2.53

Asset Number	10002398	10002398	10002398		
Section Number	001	002	003		
Section Length (miles)	1.08	1.05	0.40		
Inspection Date	01-15-2013	01-15-2013	01-15-2013		
Surface Type	Primitive	Native	Primitive		
Number of Lanes	1	1	1		
Roadway Width (feet)	8	10	8		
Condition	Poor	Fair	Fair		
Remaining Service Life (years)	2	4	3		
Estimated Cost to Repair	\$1,500	\$3,000	\$400		
Current Replacement Value	\$0	\$500,900	\$0		

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Begin Section	002-1.08						
Gate	002-1.08						
Intersection	002-1.09						
Intersection	002-1.18						
Culvert	002-1.26						
Obstacle	002-2.53						
Begin Section	003-0.97						



Turnout/Parking

Bridge

Deficiency

Culvert

Low_Water_Crossing

Water_Control_Structure

Excellent

Good

Fair

Poor

Failed

Nauhi Road

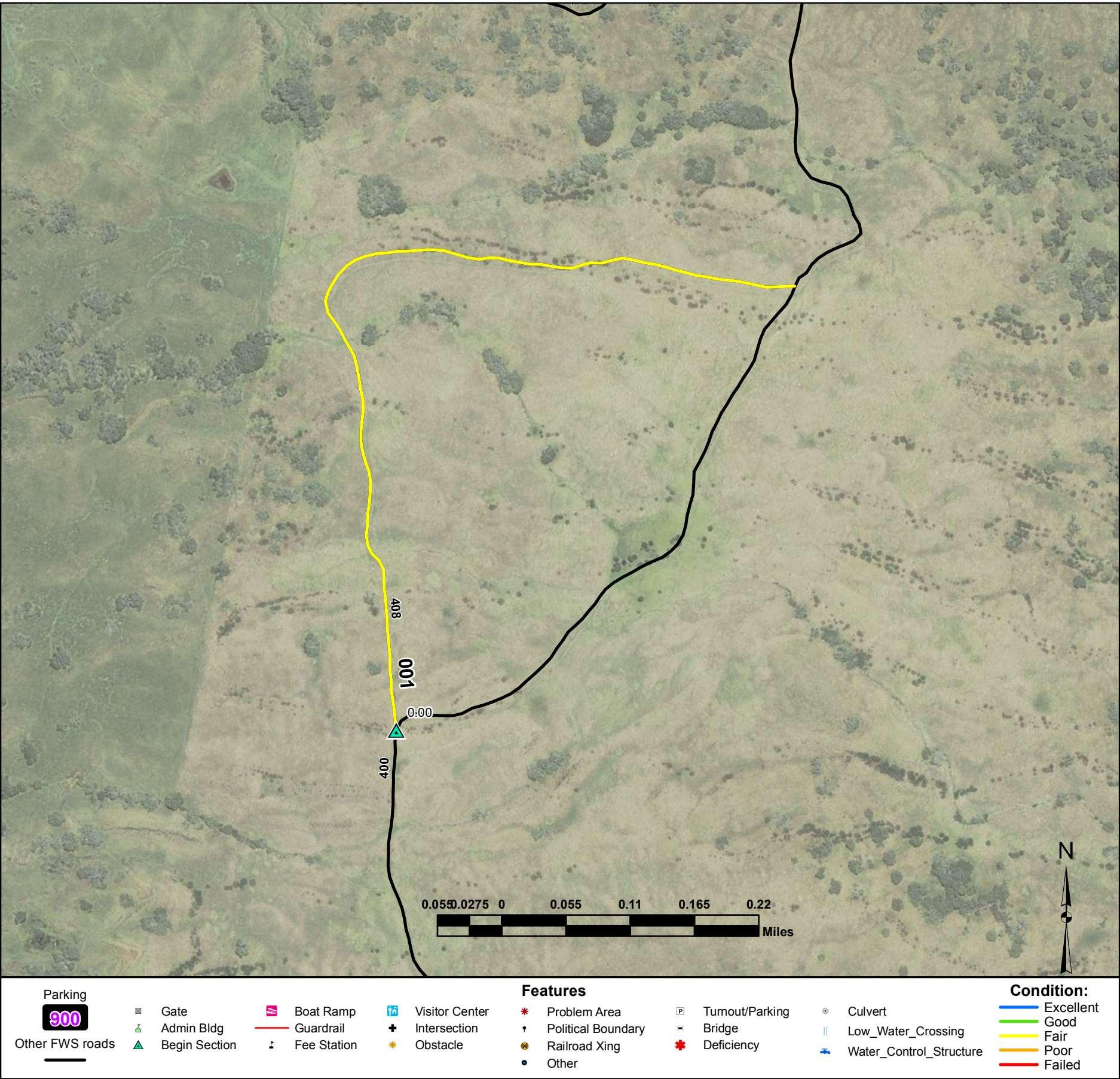
From Nauhi Creek to Refuge Boundary

Route Number: 407

Total Route Mileage: 2.26

Asset Number	10002382	10002382	10002382		
Section Number	001	002	003		
Section Length (miles)	0.96	1.00	0.30		
Inspection Date	01-15-2013	01-15-2013	01-15-2013		
Surface Type	Native	Native	Native		
Number of Lanes	1	1	1		
Roadway Width (feet)	10	10	10		
Condition	Good	Good	Good		
Remaining Service Life (years)	5	5	5		
Estimated Cost to Repair	\$2,200	\$2,300	\$700		
Current Replacement Value	\$458,000	\$477,100	\$143,100		

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Gate	001-0.0						
Gate	001-0.39						
Intersection	001-1.98						
Begin Section	002-0.96						
Intersection	002-1.85						
Begin Section	003-1.96						
Gate	003-2.26						



Konohina Cutoff Road

From Middle Road (Route 400) to Middle Road (Route 400)

Route Number: 408

Total Route Mileage: 0.65

Asset Number	10002403				
Section Number	001				
Section Length (miles)	0.65				
Inspection Date	01-15-2013				
Surface Type	Native				
Number of Lanes	1				
Roadway Width (feet)	10				
Condition	Fair				
Remaining Service Life (years)	4				
Estimated Cost to Repair	\$1,900				
Current Replacement Value	\$310,100				

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						



Maulua Cabin Road

From Maulua Road (Route 100) to obstacle

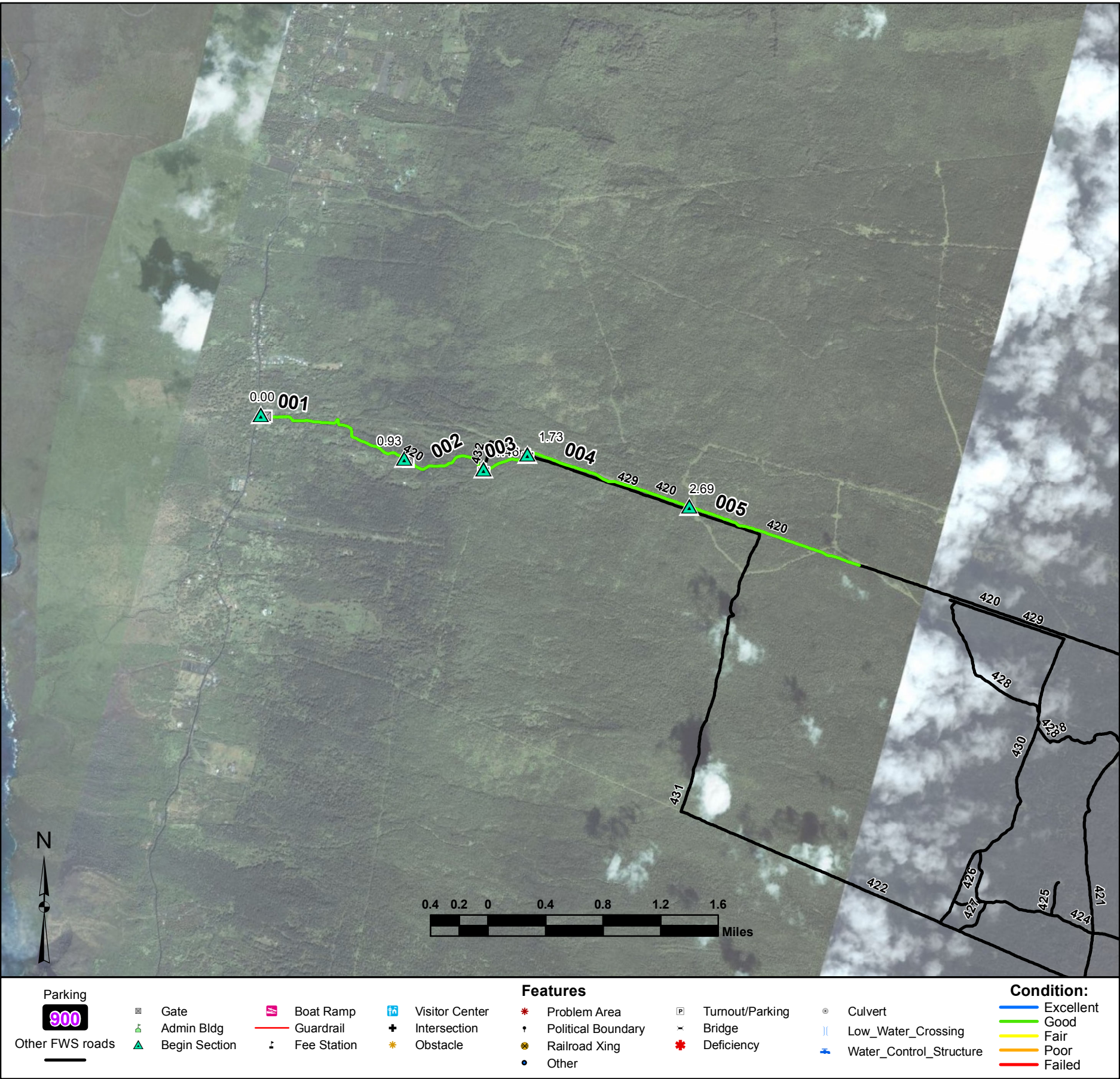
Route Number: 411

Total Route Mileage: 0.18

Asset Number	-				
Section Number	001				
Section Length (miles)	0.18				
Inspection Date	01-15-2013				
Surface Type	Native				
Number of Lanes	2				
Roadway Width (feet)	16				
Condition	Good				
Remaining Service Life (years)	7				
Estimated Cost to Repair	\$400				
Current Replacement Value	\$85,900				

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Obstacle	001-0.18						





Kona Access Road

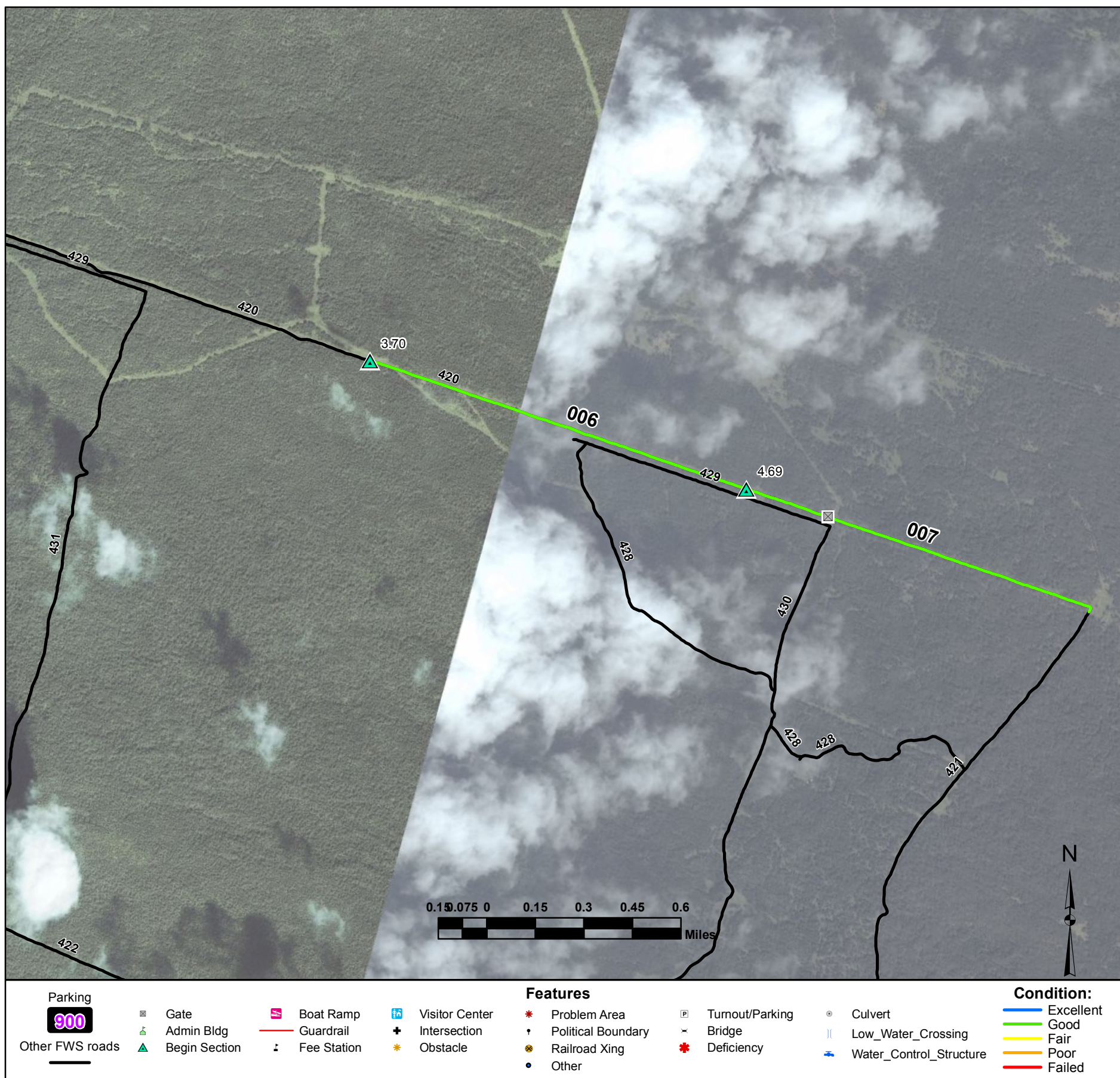
From Hawaii Belt Road to 5300ft Fenceline Road (Route 421)

Route Number: 420

Total Route Mileage: 5.61

Asset Number	10054816	10054816	10054853	10054817	10054817
Section Number	001	002	003	004	005
Section Length (miles)	0.93	0.53	0.27	0.96	1.01
Inspection Date	01-16-2013	01-16-2013	01-16-2013	01-16-2013	01-16-2013
Surface Type	Native	Native	Native	Native	Native
Number of Lanes	1	1	1	1	1
Roadway Width (feet)	10	10	10	10	10
Condition	Good	Good	Good	Good	Good
Remaining Service Life (years)	7	5	5	5	7
Estimated Cost to Repair	\$2,100	\$1,200	\$600	\$2,200	\$2,300
Current Replacement Value	\$443,700	\$252,900	\$128,800	\$458,000	\$481,900

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Gate	001-0.03						
Begin Section	002-0.93						
Gate	002-0.96						
Begin Section	003-1.46						
Intersection	003-1.46						
Begin Section	004-1.73						
Intersection	004-1.73						
Begin Section	005-2.69						



Kona Access Road

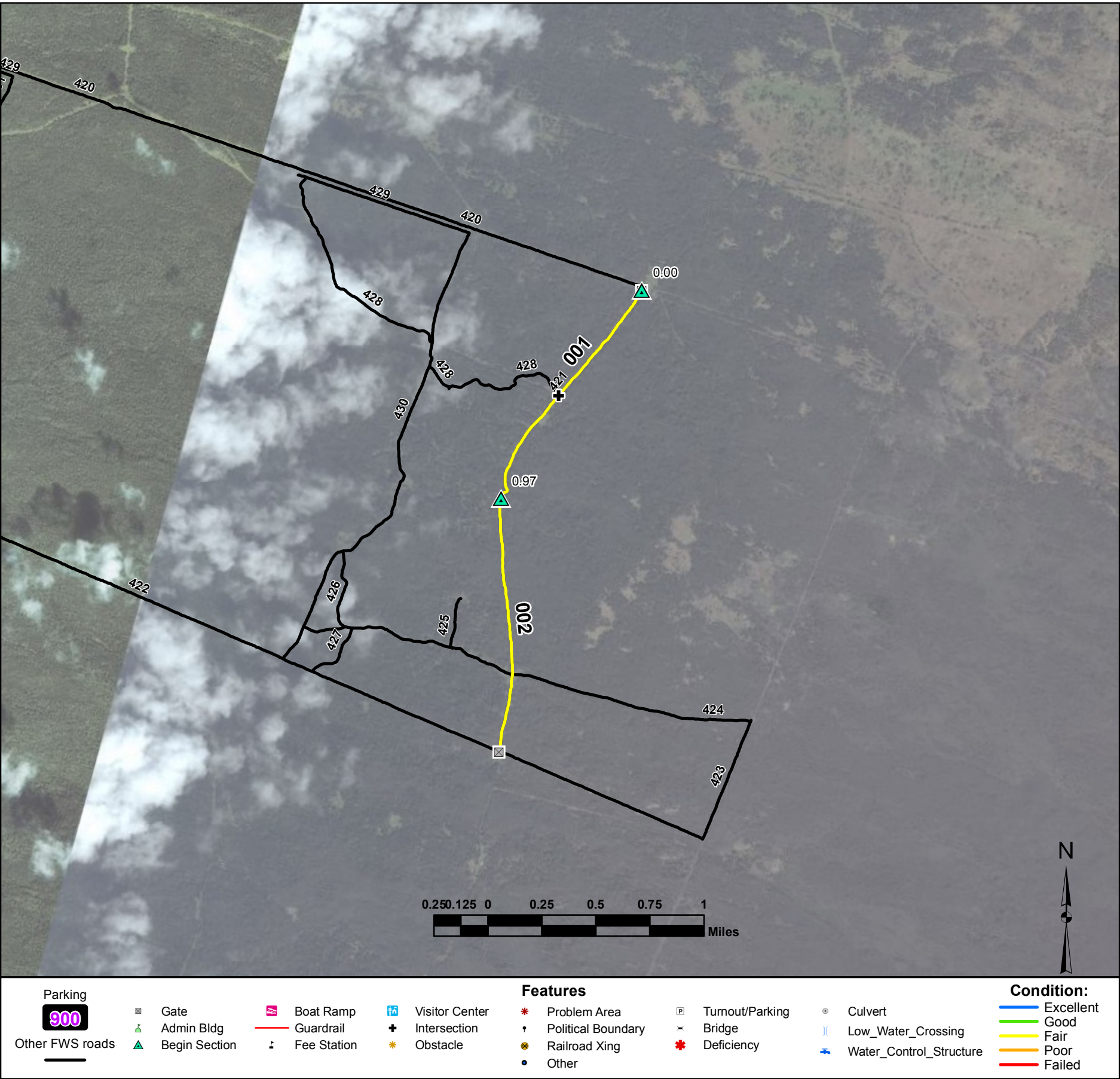
From Hawaii Belt Road to 5300ft Fenceline Road (Route 421)

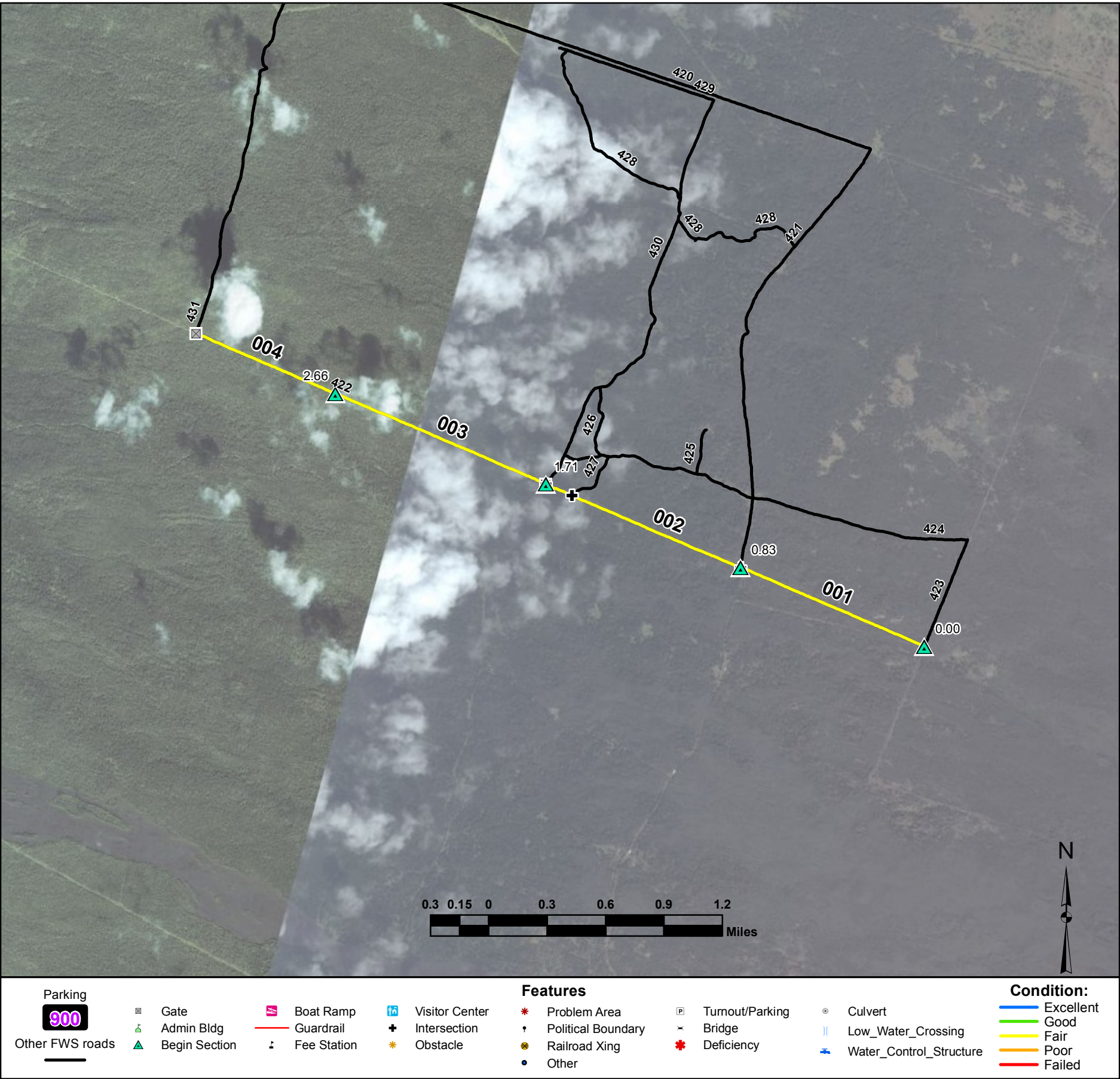
Route Number: 420

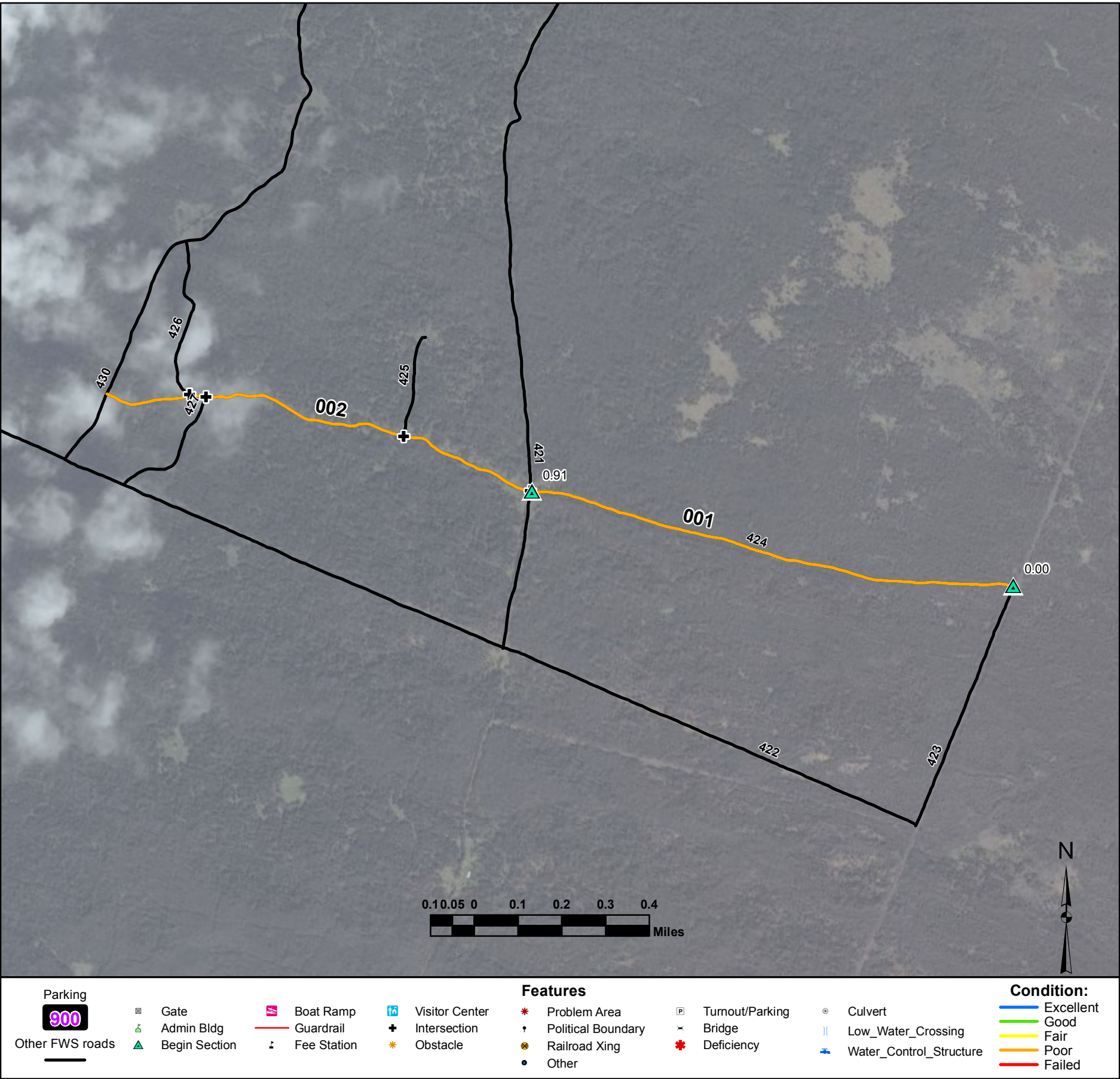
Total Route Mileage: 5.61

Asset Number	10054817	10054817			
Section Number	006	007			
Section Length (miles)	0.99	0.92			
Inspection Date	01-16-2013	01-16-2013			
Surface Type	Native	Native			
Number of Lanes	1	1			
Roadway Width (feet)	10	10			
Condition	Good	Good			
Remaining Service Life (years)	5	5			
Estimated Cost to Repair	\$2,300	\$2,100			
Current Replacement Value	\$472,300	\$438,900			

Features Begin Section Begin Section Gate	Mile Post 006-3.7 007-4.69 007-4.91	Features	Mile Post	Features	Mile Post	Features	Mile Post
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Aviary Road

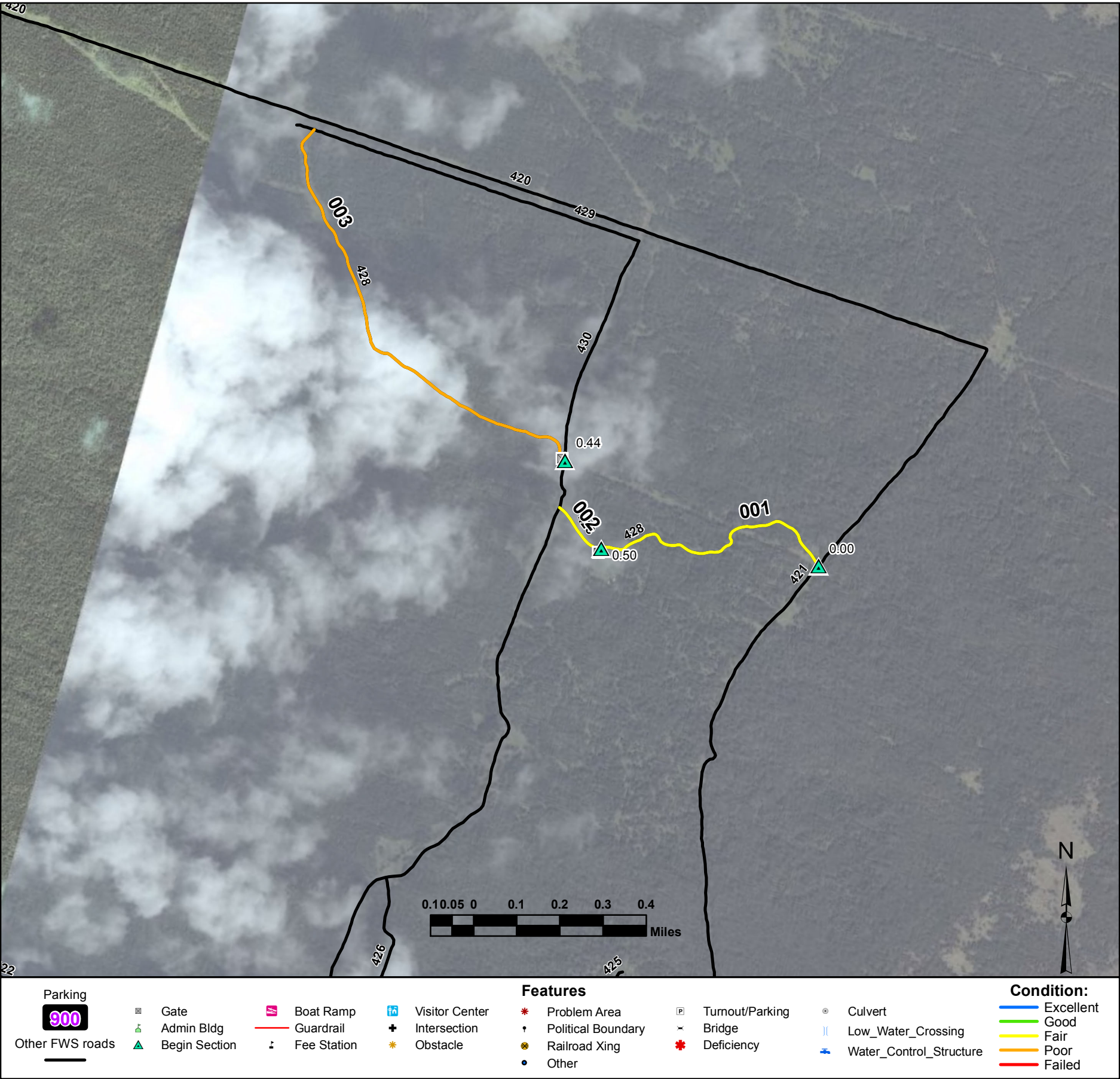
From Kalahiki Road (Route 424) to South Boundary Road (Route 422)

Route Number: 427

Total Route Mileage: 0.24

Asset Number	10001969				
Section Number	001				
Section Length (miles)	0.24				
Inspection Date	01-16-2013				
Surface Type	Primitive				
Number of Lanes	1				
Roadway Width (feet)	10				
Condition	Fair				
Remaining Service Life (years)	4				
Estimated Cost to Repair	\$200				
Current Replacement Value	\$0				

Features Begin Section	Mile Post 001-0.0	Features	Mile Post	Features	Mile Post	Features	Mile Post
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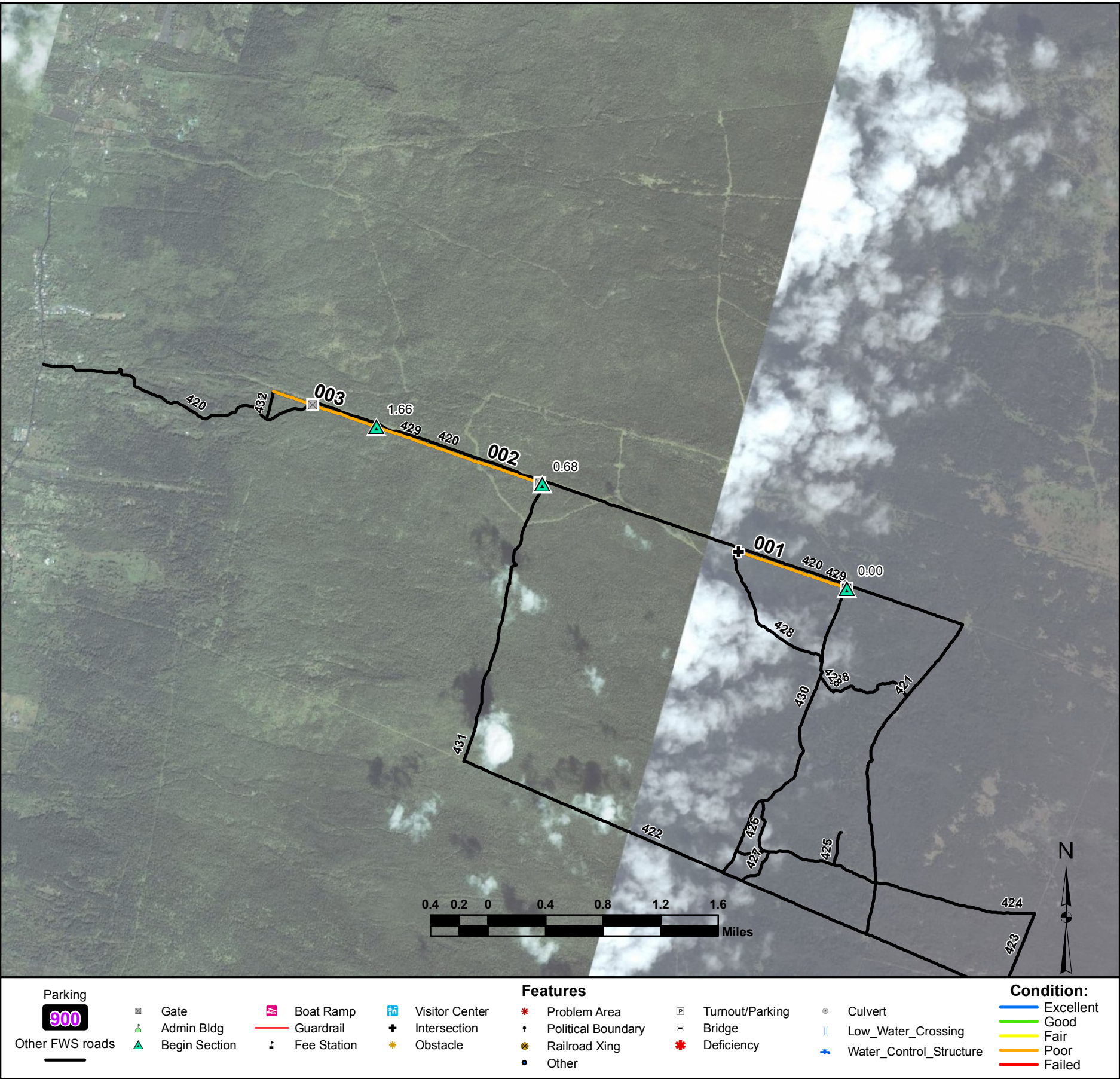


Dog Leg Road
From 5300ft Fenceline Road (Route 421) to North Boundary Road (Route 429)

Route Number: 428Total Route Mileage: 1.49

Asset Number	10001956	10001956	10001956		
Section Number	001	002	003		
Section Length (miles)	0.51	0.11	0.87		
Inspection Date	01-16-2013	01-16-2013	01-16-2013		
Surface Type	Primitive	Primitive	Primitive		
Number of Lanes	1	1	1		
Roadway Width (feet)	10	10	10		
Condition	Fair	Fair	Poor		
Remaining Service Life (years)	4	4	2		
Estimated Cost to Repair	\$500	\$100	\$1,200		
Current Replacement Value	\$0	\$0	\$0		

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Gate	001-0.51						
Begin Section	002-0.5						
Begin Section	003-0.44						
Gate	003-0.44						



North Boundary Road

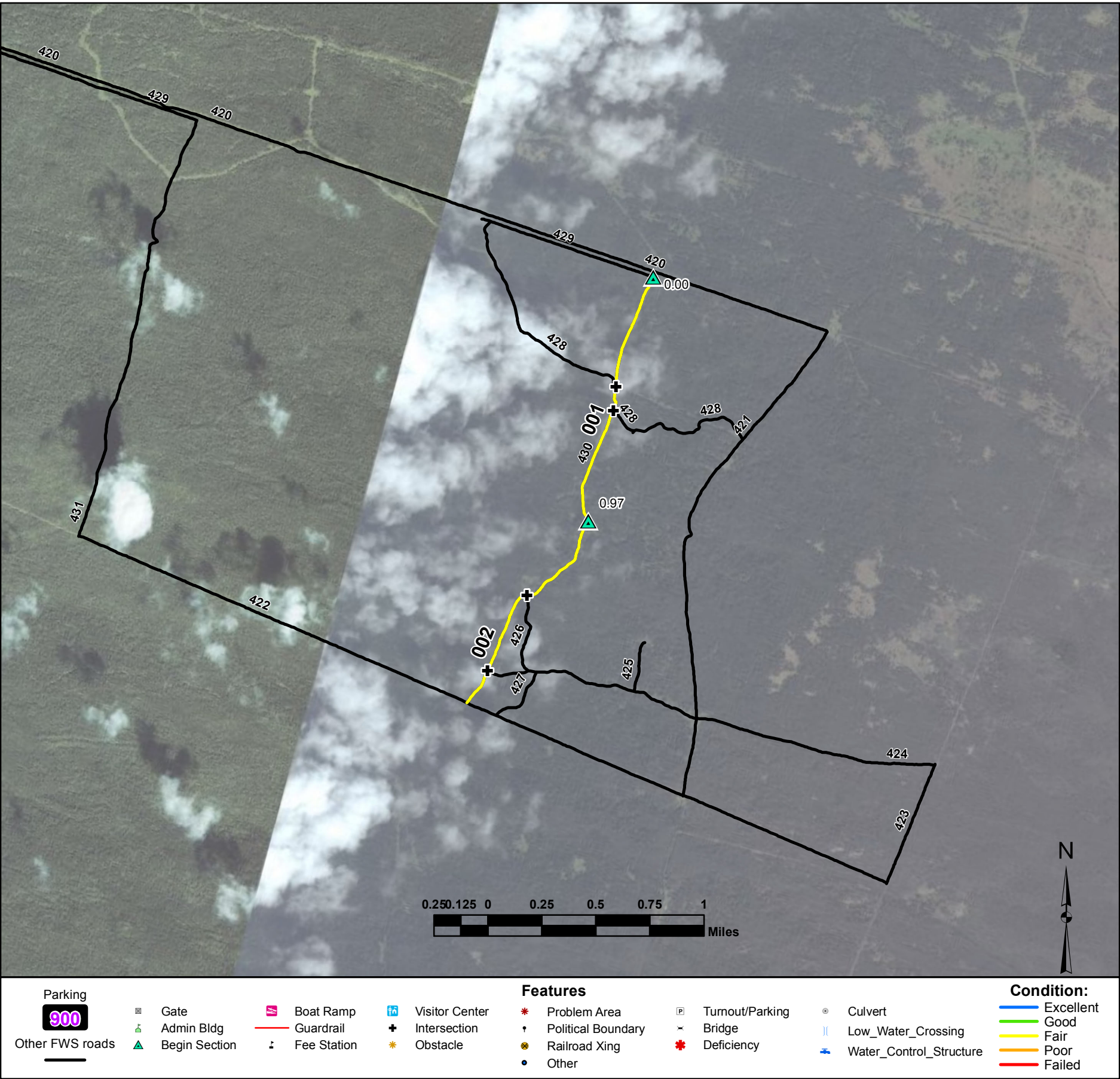
From 4800ft Fenceline Road (Route 430) to West Boundary Road (Route 432)

Route Number: 429

Total Route Mileage: 2.27

Asset Number	-	-	-		
Section Number	001	002	003		
Section Length (miles)	0.68	0.98	0.61		
Inspection Date	01-16-2013	01-16-2013	01-16-2013		
Surface Type	Native	Native	Native		
Number of Lanes	1	1	1		
Roadway Width (feet)	10	10	10		
Condition	Poor	Poor	Poor		
Remaining Service Life (years)	2	2	2		
Estimated Cost to Repair	\$28,500	\$41,100	\$25,600		
Current Replacement Value	\$324,400	\$467,500	\$291,000		

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Gate	001-0.0						
Intersection	001-0.65						
Begin Section	002-0.68						
Gate	002-0.69						
Begin Section	003-1.66						
Gate	003-2.04						





From South refuge boundary to North Boundary Road (Route 429)

Route Number: 431

Total Route Mileage: 1.66

Asset Number	-	-			
Section Number	001	002			
Section Length (miles)	0.97	0.69			
Inspection Date	01-16-2013	01-16-2013			
Surface Type	Native	Native			
Number of Lanes	1	1			
Roadway Width (feet)	10	10			
Condition	Fair	Fair			
Remaining Service Life (years)	3	3			
Estimated Cost to Repair	\$2,800	\$2,000			
Current Replacement Value	\$462,800	\$329,200			

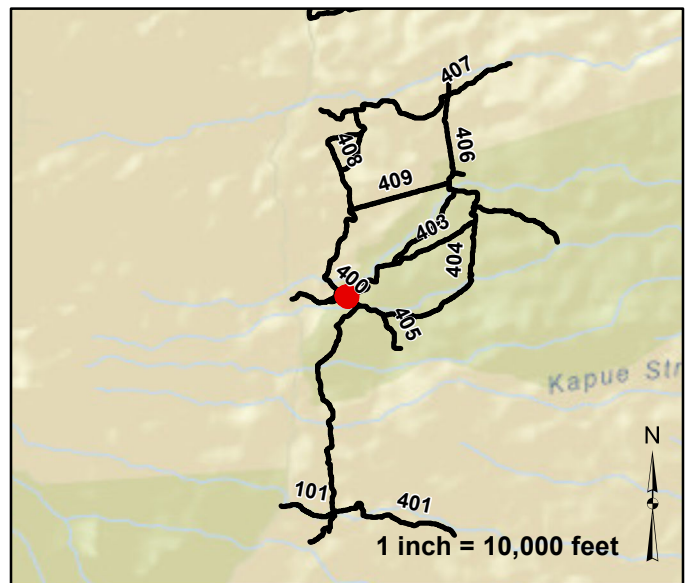
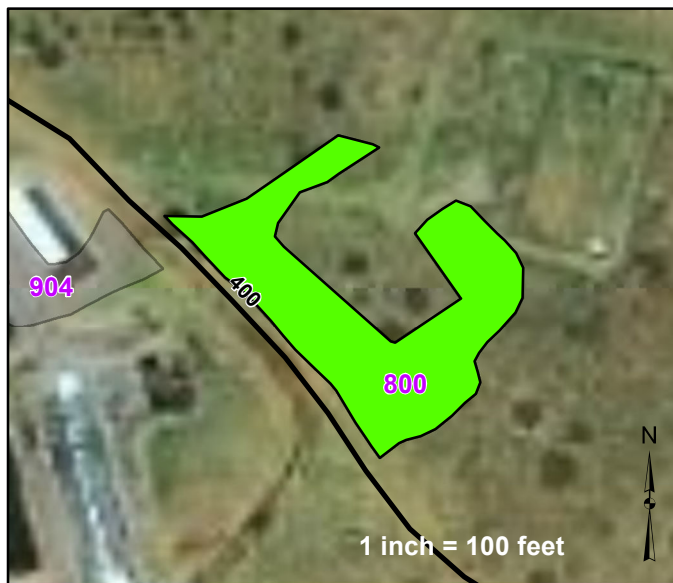
Features Begin Section Intersection Begin Section	Mile Post 001-0.0 001-0.0 002-0.97	Features	Mile Post	Features	Mile Post	Features	Mile Post
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Route Number: 800

Shop Parking

From Middle Road (Route 400)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
-	10085	5	Good	Gravel	\$2,000	01-14-2013	\$66,800



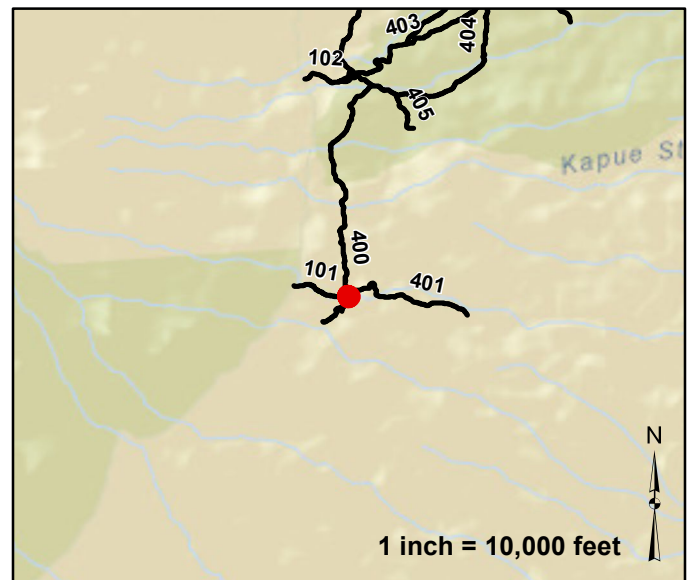
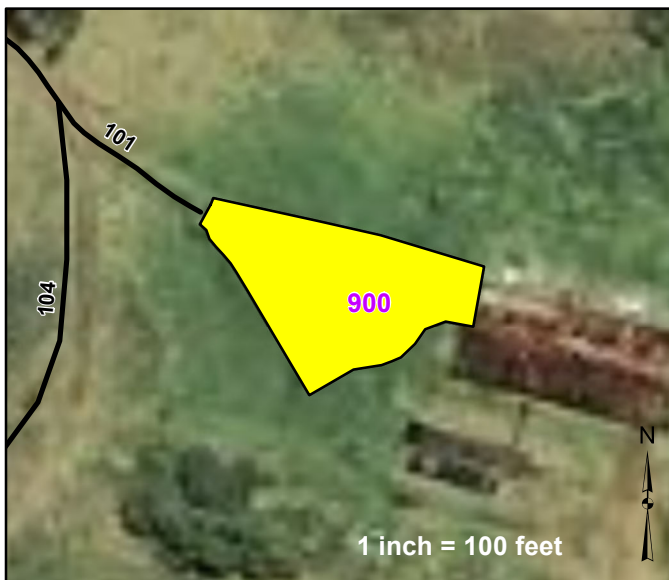
Parking			Features			Condition:				
		Gate		Boat Ramp		Visitor Center		Culvert		Excellent
Other FWS roads		Admin Bldg		Guardrail		Other		Low_Water_Crossing		Good
		Begin Section		Fee Station		Problem Area		Water_Control_Structure		Fair
										Poor
										Failed

Route Number: 900

Pua Akala Parking

From Pua Akala Road (Route 101)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
10042167	7566	10	Fair	Native	\$2,700	01-14-2013	\$21,600



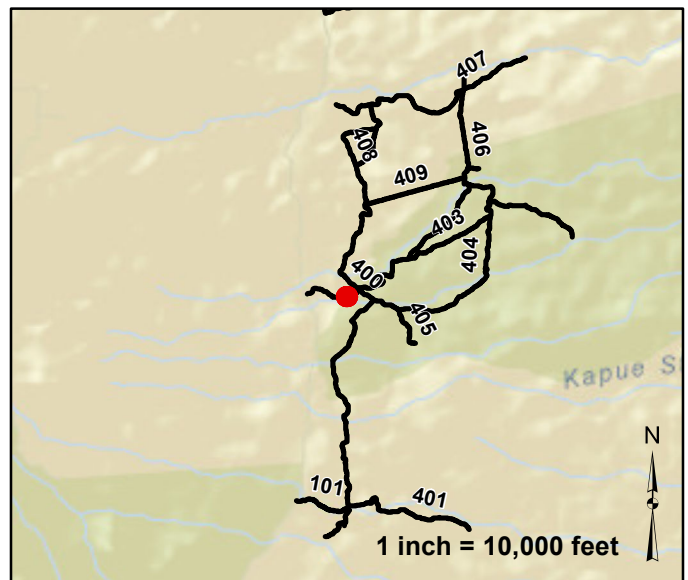
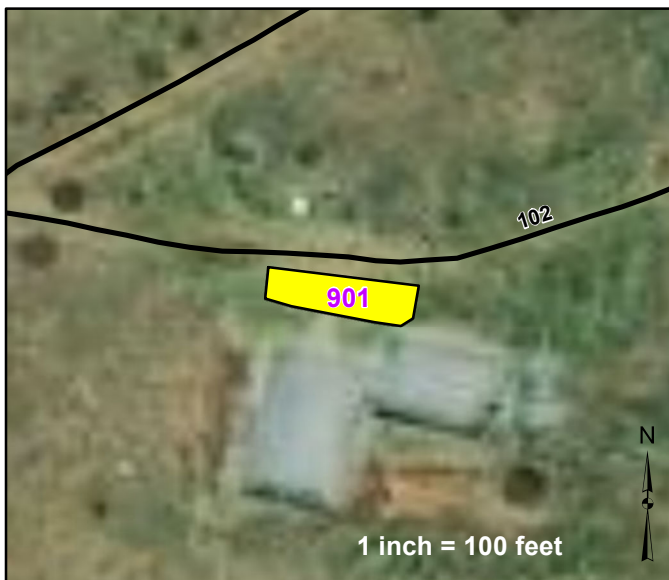
Parking		Features				Condition:	
	Gate		Boat Ramp		Visitor Center		Excellent
Other FWS roads		Admin Bldg		Guardrail		Other	Good
		Begin Section		Fee Station		Problem Area	Fair
						Culvert	Poor
						Low_Water_Crossing	Failed
						Water_Control_Structure	

Route Number: 901

Biological Field Unit Parking

From Hakalau Cabin/ Administration Access Road (Route 102)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
10042168	1461	2	Fair	Gravel	\$500	01-14-2013	\$9,700

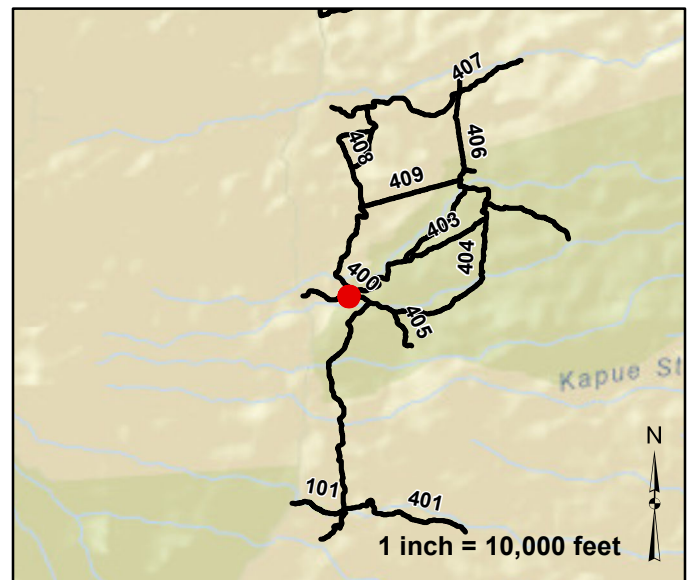
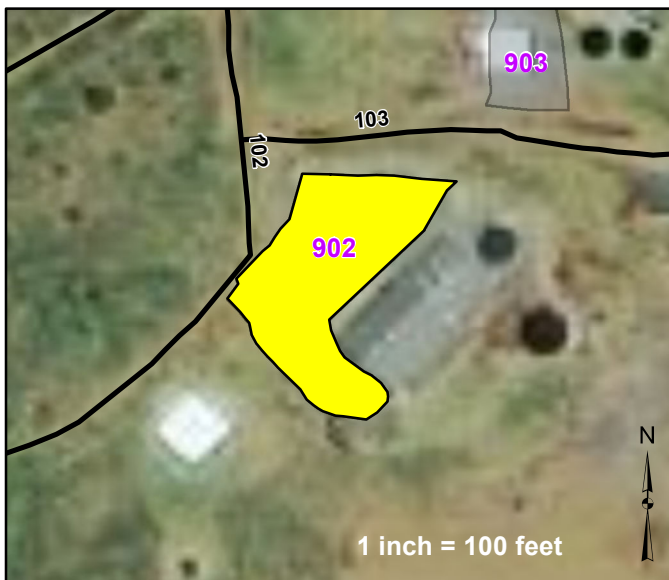


Parking		Features		Condition:	
	Gate		Boat Ramp		Excellent
	Admin Bldg		Guardrail		Good
	Begin Section		Fee Station		Fair
	Other FWS roads		Visitor Center		Poor
			Other		Failed
			Problem Area		
			Culvert		
			Low_Water_Crossing		
			Water_Control_Structure		

Route Number: 902 New Housing Parking

From Hakalau Cabin/ Administration Access Road (Route 102)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
10042169	6865	10	Fair	Gravel	\$2,400	01-14-2013	\$45,400



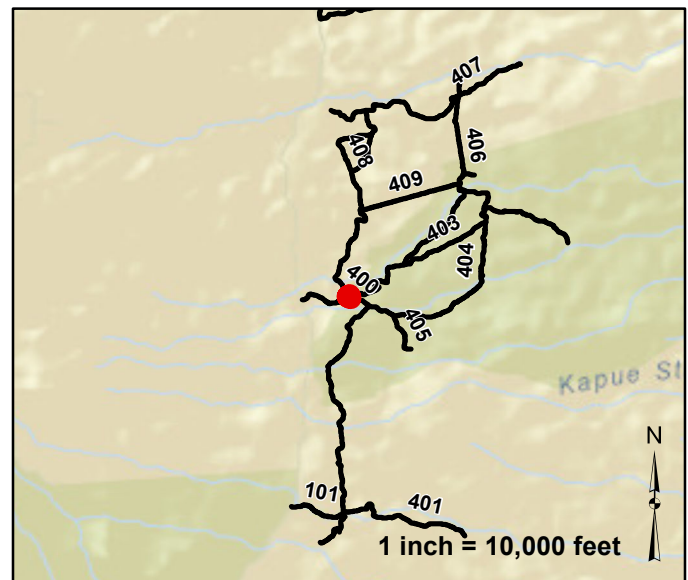
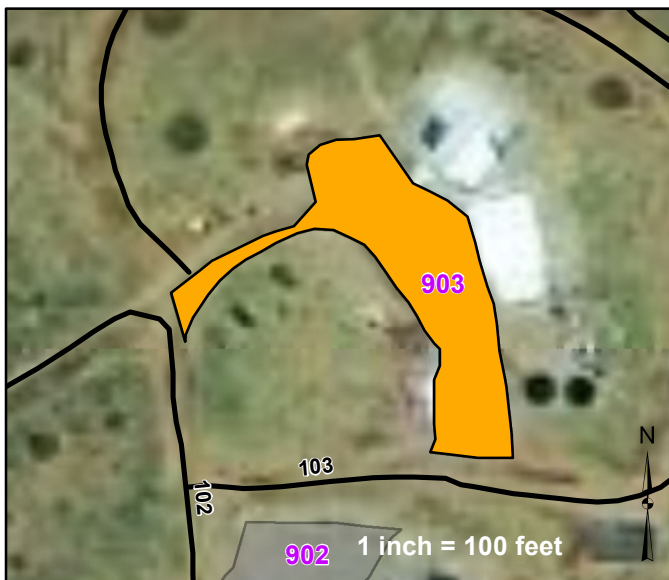
Parking		Features				Condition:	
	Gate		Boat Ramp		Visitor Center		Excellent
Other FWS roads		Admin Bldg		Guardrail		Other	Good
		Begin Section		Fee Station		Problem Area	Fair
						Culvert	Poor
						Low_Water_Crossing	Failed
						Water_Control_Structure	

Route Number: 903

Housing Parking

From Hakalau Cabin/ Administration Access Road (Route 102)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
10042170	8121	4	Poor	Gravel	\$12,000	01-14-2013	\$53,800



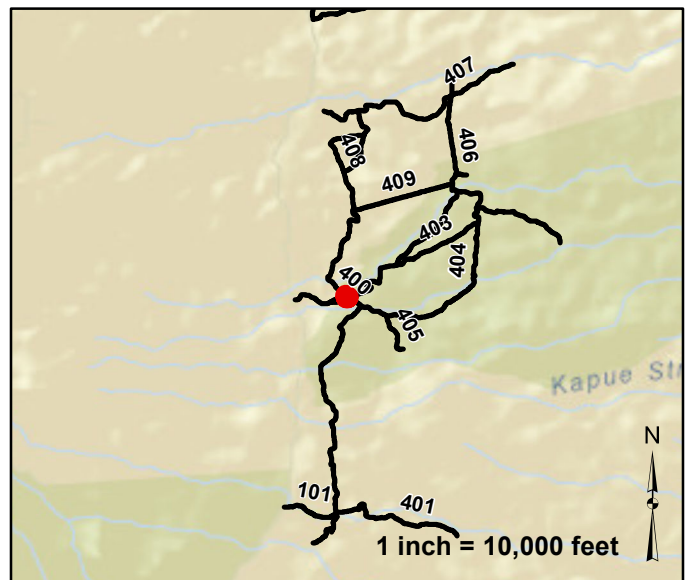
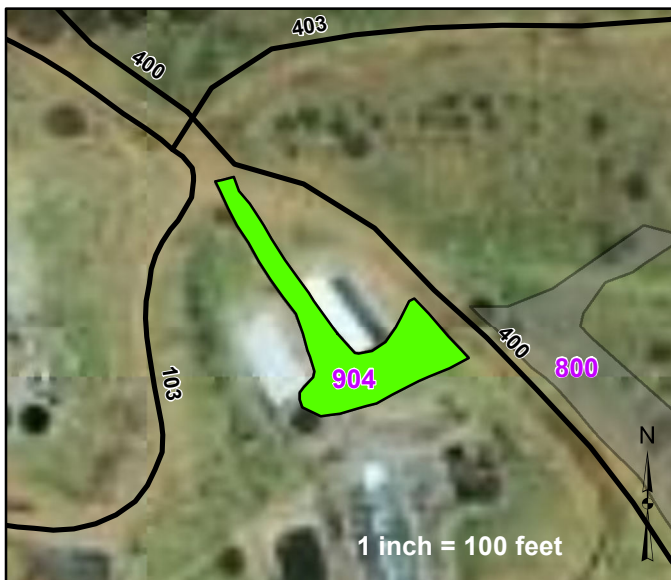
Parking		Features				Condition:	
	Gate		Boat Ramp		Visitor Center		Excellent
Other FWS roads			Guardrail		Other		Good
			Fee Station		Problem Area		Fair
					Culvert		Poor
					Low_Water_Crossing		Failed
					Water_Control_Structure		

Route Number: 904

Greenhouse Parking

From Middle Road (Route 400)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
10042171	3528	5	Good	Gravel	\$700	01-14-2013	\$23,400



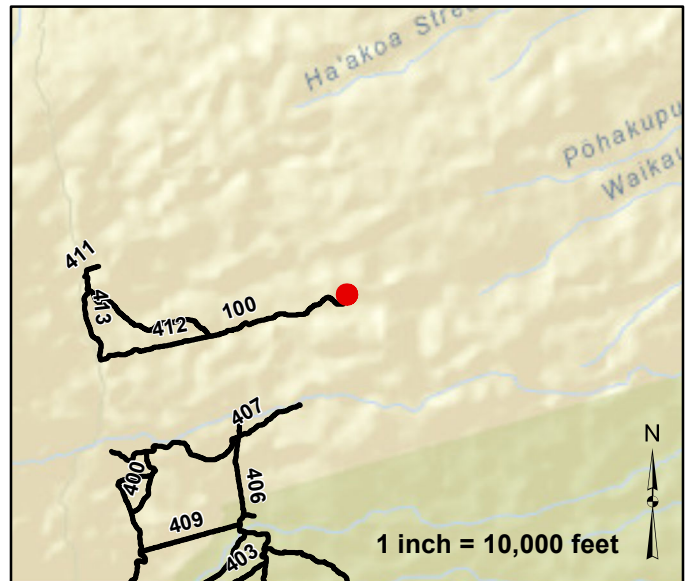
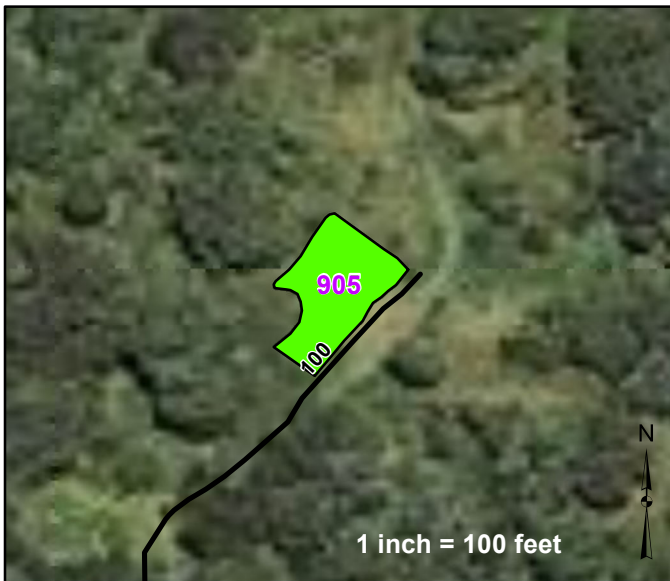
Parking		Features		Condition:	
	Gate		Boat Ramp		Excellent
Other FWS roads	Admin Bldg	Guardrail	Other		Good
	Begin Section	Fee Station	Problem Area		Fair
			Culvert		Poor
			Low_Water_Crossing		Failed
			Water_Control_Structure		

Route Number: 905

Miller Parking

From Maulua Road (Route 100)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
10053544	2764	6	Good	Native	\$600	01-15-2013	\$7,900



Parking		Features				Condition:	
Other FWS roads							

Hakalau Forest Bridge Inventory					
Rte #	Milepost	NBIS #	Sufficiency Rating	Functionally Obsolete	Structurally Deficient
No Bridges to Report					

ROUTE: 100

Features Photographs



Photo: HAFO_C4_0913 Route: 100-001-0.0
Begin Section



Photo: HAFO_C4_0913 Route: 100-001-0.01
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0927 Route: 100-002-1.02
Begin Section



Photo: HAFO_C4_0924 Route: 100-003-2.03
Begin Section



Photo: HAFO_C4_0922 Route: 100-004-3.04
Begin Section

ROUTE: 101

Features Photographs



Photo: HAFO_C4_0874 Route: 101-001-0.0
Begin Section



Photo: HAFO_C4_0873 Route: 101-001-0.01
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0871 Route: 101-002-0.15
Begin Section



Photo: HAFO_C4_0872 Route: 101-002-0.15
Metal Open Rail Gate
Asset# NA

ROUTE: 102

Features Photographs



Photo: HAFO_C4_0844 Route: 102-001-0.0
Begin Section new section



Photo: HAFO_C4_0846 Route: 102-002-0.27
Begin Section



Photo: HAFO_C4_0845 Route: 102-002-0.27
Metal Open Rail Gate
Asset# NA

ROUTE: 103

Features Photographs



Photo: HAFO_C4_0848 Route: 103-001-0.0
Begin Section

ROUTE: 104

Features Photographs



Photo: HAFO_C4_0863 Route: 104-001-0.0
Begin Section

ROUTE: 400

Features Photographs



Photo: HAFO_C4_0893 Route: 400-001-0.0
Begin Section



Photo: HAFO_C4_0895 Route: 400-002-0.92
Begin Section



Photo: HAFO_C4_0896 Route: 400-002-1.14
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0897 Route: 400-003-1.87
Begin Section



Photo: HAFO_C4_0859 Route: 400-004-2.23
Begin Section



Photo: HAFO_C4_0860 Route: 400-005-3.21
Begin Section

ROUTE: 400

Features Photographs



Photo: HAFO_C4_0861 Route: 400-006-4.27
Begin Section



Photo: HAFO_C4_0862 Route: 400-006-4.31
Metal Open Rail Gate
Asset# NA

ROUTE: 401

Features Photographs



Photo: HAFO_C4_0866 Route: 401-001-0.0
Begin Section



Photo: HAFO_C4_0867 Route: 401-001-0.4
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0868 Route: 401-002-0.41
Begin Section

ROUTE: 402

Features Photographs



Photo: HAFO_C4_0869 Route: 402-001-0.0
Begin Section



Photo: HAFO_C4_0870 Route: 402-001-0.28
Obstacle Road too rutted to continue

ROUTE: 403

Features Photographs



Photo: HAFO_C4_0875 Route: 403-001-0.0
Begin Section



Photo: HAFO_C4_0876 Route: 403-002-0.96
Begin Section



Photo: HAFO_C4_0877 Route: 403-003-1.89
Begin Section

ROUTE: 404

Features Photographs



Photo: HAFO_C4_0878 Route: 404-001-0.0
Begin Section



Photo: HAFO_C4_0880 Route: 404-002-0.92
Begin Section

ROUTE: 405

Features Photographs



Photo: HAFO_C4_0879 Route: 405-001-0.0
Begin Section

ROUTE: 406

Features Photographs



Photo: HAFO_C4_0881 Route: 406-001-0.0
Begin Section



Photo: HAFO_C4_0884 Route: 406-002-1.08
Begin Section



Photo: HAFO_C4_0882 Route: 406-002-1.08
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0885 Route: 406-002-1.26
Plastic Culvert 25ft long 24in dia. 1ft deep
Asset# NA



Photo: HAFO_C4_0886 Route: 406-002-1.26
Plastic Culvert 25ft long 24in dia. 1ft deep
Asset# NA



Photo: HAFO_C4_0883 Route: 406-003-0.97
Begin Section

ROUTE: 407

Features Photographs



Photo: HAFO_C4_0887 Route: 407-001-0.0
Begin Section



Photo: HAFO_C4_0888 Route: 407-001-0.0
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0889 Route: 407-001-0.39
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0890 Route: 407-002-0.96
Begin Section



Photo: HAFO_C4_0891 Route: 407-003-1.96
Begin Section



Photo: HAFO_C4_0892 Route: 407-003-2.26
Metal Open Rail Gate
Asset# NA

ROUTE: 408

Features Photographs



Photo: HAFO_C4_0894 Route: 408-001-0.0
Begin Section

ROUTE: 409

Features Photographs



Photo: HAFO_C4_0910 Route: 409-001-0.0
Begin Section

ROUTE: 410

Features Photographs



Photo: HAFO_C4_0911 Route: 410-001-0.0
Begin Section



Photo: HAFO_C4_0912 Route: 410-001-0.11
Obstacle Road is too muddy to continue.

ROUTE: 411

Features Photographs



Photo: HAFO_C4_0930 Route: 411-001-0.0
Begin Section



Photo: HAFO_C4_0931 Route: 411-001-0.18
Obstacle Too muddy and slick to continue

ROUTE: 412

Features Photographs



Photo: HAFO_C4_0916 Route: 412-001-0.0
Begin Section



Photo: HAFO_C4_0915 Route: 412-001-0.0
Metal Open Rail Gate
Asset# NA

ROUTE: 413

Features Photographs



Photo: HAFO_C4_0914 Route: 413-001-0.0
Begin Section

ROUTE: 420

Features Photographs



Photo: HAFO_C4_0932 Route: 420-001-0.0
Begin Section



Photo: HAFO_C4_0933 Route: 420-001-0.03
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0934 Route: 420-002-0.93
Begin Section



Photo: HAFO_C4_0935 Route: 420-002-0.96
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0936 Route: 420-003-1.46
Begin Section



Photo: HAFO_C4_0937 Route: 420-004-1.73
Begin Section

ROUTE: 420

Features Photographs



Photo: HAFO_C4_0938 Route: 420-005-2.69
Begin Section



Photo: HAFO_C4_0939 Route: 420-006-3.7
Begin Section



Photo: HAFO_C4_0940 Route: 420-007-4.69
Begin Section



Photo: HAFO_C4_0941 Route: 420-007-4.91
Metal Open Rail Gate
Asset# NA

ROUTE: 421

Features Photographs



Photo: HAFO_C4_0943 Route: 421-001-0.0
Begin Section



Photo: HAFO_C4_0942 Route: 421-001-0.0
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0944 Route: 421-002-0.97
Begin Section



Photo: HAFO_C4_0945 Route: 421-002-1.93
Metal Open Rail Gate
Asset# NA

ROUTE: 422

Features Photographs



Photo: HAFO_C4_0946 Route: 422-001-0.0
Begin Section



Photo: HAFO_C4_0954 Route: 422-002-0.83
Begin Section



Photo: HAFO_C4_0967 Route: 422-003-1.71
Begin Section



Photo: HAFO_C4_0966 Route: 422-003-1.71
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0969 Route: 422-004-0.0
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0968 Route: 422-004-2.66
Begin Section

ROUTE: 423

Features Photographs



Photo: HAFO_C4_0947 Route: 423-001-0.0
Begin Section



Photo: HAFO_C4_0948 Route: 423-001-0.0
Metal Open Rail Gate
Asset# NA

ROUTE: 424

Features Photographs



Photo: HAFO_C4_0949 Route: 424-001-0.0
Begin Section



Photo: HAFO_C4_0950 Route: 424-002-0.91
Begin Section

ROUTE: 425

Features Photographs



Photo: HAFO_C4_0951 Route: 425-001-0.0
Begin Section

ROUTE: 426

Features Photographs



Photo: HAFO_C4_0952 Route: 426-001-0.0
Begin Section

ROUTE: 427

Features Photographs



Photo: HAFO_C4_0953 Route: 427-001-0.0
Begin Section

ROUTE: 428

Features Photographs



Photo: HAFO_C4_0957 Route: 428-001-0.0
Begin Section



Photo: HAFO_C4_0958 Route: 428-001-0.51
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0959 Route: 428-002-0.5
Begin Section



Photo: HAFO_C4_0961 Route: 428-003-0.44
Begin Section



Photo: HAFO_C4_0960 Route: 428-003-0.44
Metal Open Rail Gate
Asset# NA

ROUTE: 429

Features Photographs



Photo: HAFO_C4_0962 Route: 429-001-0.0
Begin Section



Photo: HAFO_C4_0963 Route: 429-001-0.0
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0972 Route: 429-002-0.68
Begin Section



Photo: HAFO_C4_0973 Route: 429-002-0.69
Metal Open Rail Gate
Asset# NA



Photo: HAFO_C4_0974 Route: 429-003-1.66
Begin Section



Photo: HAFO_C4_0975 Route: 429-003-2.04
Metal Open Rail Gate
Asset# NA

ROUTE: 430

Features Photographs



Photo: HAFO_C4_0964 Route: 430-001-0.0
Begin Section



Photo: HAFO_C4_0965 Route: 430-002-0.97
Begin Section

ROUTE: 431

Features Photographs



Photo: HAFO_C4_0970 Route: 431-001-0.0
Begin Section



Photo: HAFO_C4_0971 Route: 431-002-0.97
Begin Section

ROUTE: 432

Features Photographs



Photo: HAFO_C4_0977 Route: 432-001-0.0
Begin Section

ROUTE: 600

Features Photographs



Photo: HAFO_C4_0923 Route: 600-001-0.0
Obstacle Location of Freddy's Pond Road. #10002407
ATV trail that is too muddy to drive.



Photo: HAFO_C4_0926 Route: 600-001-0.0
Obstacle Location of Halfway Road. #10002406 ATV
trail that is too muddy to drive.



Photo: HAFO_C4_0956 Route: 600-001-0.5
Obstacle Location of Hookena Loop Road. #10001968
Tree down unable to access



Photo: HAFO_C4_0919 Route: 600-001-3.11
Obstacle Location of Bottom Road. #10002408. ATV
trail that is too muddy to drive.

Accident Summary

Number of Accidents Reported	Timespan of Accidents	Injuries	Fatalities
0	No Accidents to Report	0	0

APPENDIX

TABLE 1 - GENERAL FWS ROAD FUNCTIONAL CLASSIFICATION	
Class I	Principal Refuge Road (Public Roads) - Routes that constitute the main access route, main auto tour route, or thoroughfare for refuge visitors. These routes are accessible by 2WD vehicles. Routes are numbered from 10 to 99.
Class II	Connector Refuge Road (Public Roads) - Routes that provide circulation within the refuge. These routes can also provide access to areas of scenic, scientific, recreational or cultural interest, such as overlooks, campgrounds, education centers, etc. These routes are accessible by 2WD vehicles. Routes are numbered from 100 to 199.
Class III	Special Purpose Refuge Road (Public Roads) - Roads that provide circulation within special use areas such as campgrounds or public concessionaire facilities or access to remote areas of the refuge. These routes may not be 2WD accessible. Routes are numbered from 200 to 299
Class IV	Administrative Access Road (Administrative Roads) - Routes intended for access to administrative developments or structures such as maintenance offices, employee quarters, or utility areas. These routes are accessible by 2WD vehicles. These routes may restrict access to the general public. Routes are numbered from 300 to 399.
Class V	Restricted Road (Administrative Roads) - Routes normally closed to the public, such as maintenance roads, service roads, patrol roads, and fire breaks. These routes may be open to the public for a short period of time for a special use, such as hunting access. These routes may not be 2WD accessible. Routes are numbered from 400 to 499.

A refuge road system contains those routes within or giving access to a refuge or other unit of the FWS that are administered by the FWS, or by the Service in cooperation with other agencies. The assignment of a functional classification (FC) to a refuge road is not based on traffic volumes or design speed, but on the intended use or function of that route

DESCRIPTION OF RATING SYSTEM

Rating Data is collected on four different surface types: Asphalt, Concrete, Gravel, and Native. The Utah LTAP Center's Remaining Service Life (RSL) system is used for all surface types. The RSL system is based on the Strategic Highway Research Program's (SHRP) Distress Identification Manual.

Asphalt Rating System

Data is collected on the following distresses and conditions:

- **Fatigue Cracking** - Interconnected cracks forming small irregular shapes.
- **Longitudinal Cracking** - Cracks running parallel with the roadway, in the direction of traffic.
- **Transverse Cracking** - Cracks perpendicular to the roadway, going across the lane or lanes.
- **Block Cracking** - Interconnected cracks forming large blocks.
- **Edge Cracking** - Cracks running along the edge of the pavement surface.
- **Patches** - Original surface repaired with new asphalt patch material.
- **Potholes** - Holes or depressions in the pavement.
- **Rutting** - surface depressions in the wheel paths.
- **Roughness** - Evenness of pavement for serviceability.
- **Drainage** - Ability of the road surface to drain water based on proper slope.

A Condition Rating value is calculated for each homogenous pavement section, and can be up to 1 mile in length.

Rating Index Formula

Fatigue, longitudinal, transverse, block, and edge cracking, along with patching and potholes are rated on a 0 - 9 scale (0 = no distress, 9 = maximum distress). The rating given is based on the extent and the severity of the distress. Rutting, roughness, and drainage are rated on a 0 - 3 scale (0 = excellent, 3 = poor). Each distress type has given Remaining Service Life (RSL) values (in years) based on the rating for that particular distress. The distress with the rating resulting in the lowest RSL value is considered to be the governing distress. That value is then assigned as the RSL of the road segment.

Concrete Rating System

Data is collected on the following distresses and conditions:

- **Spalling of Joints** - Chipping, breaking, or cracking of slab edges
- **Joint Seal Damage** - Any damage or condition that enables materials or water to infiltrate into the joint from the surface.
- **Corner Breaks** - A portion of the slab separated by a crack that intersects the adjacent transverse and longitudinal joints, forming approximately a 45° angle to the direction.
- **Broken Slabs** - Faulting and/or cracking localized to individual slabs.

- **Faulting** – Difference in elevation across a crack or joint.
- **Longitudinal Cracking** – Cracks in the pavement running parallel to road.
- **Transverse Cracking** - Cracks in the pavement running perpendicular to the direction of traffic.
- **Patch Deterioration** – Faulting, settling, or cracking of previously placed patch
- **Map Cracking** – A series of cracks that extend only into the upper surface of the Slab

A Condition Rating value is calculated for each homogenous pavement section, and can be up to 1 mile in length.

Rating Index Formula

The rating procedure for concrete pavement is the same as that for asphalt pavement described previously. Each of the distresses described above are rated on the same 0 – 9 scale. The governing distress is then determined and the RSL associated with that distress is assigned to the road segment.

Gravel and Native Rating System

Data is collected on the following distresses and conditions:

- **Cross Section (Crown)** - Roadway built so that the center is higher than the shoulder, to prevent water from pooling on roadway.
- **Roadside Drainage** - Roadside ditches and culverts to handle water flow and prevent pooling on the roadside.
- **Corrugations (Washboarding)** - Small trenches or holes developing perpendicular to the roadway.
- **Potholes** - Holes or depressions in the roadway.
- **Rutting** - Depressions running parallel with the roadway, in the wheelpaths.
- **Dust** - Amount of dust caused by traffic.
- **Loose Aggregate (Gravel Only)** - Loose gravel, typically piled up on the roadway edges or centerline.

A Condition Rating value is calculated for each homogenous pavement section, and can be up to 1 mile in length.

Rating Index Formula

The rating procedure for unpaved roads is the same as that for asphalt and concrete pavements described previously. Of the distresses described above, corrugations, potholes, rutting, and loose aggregate are rated on the same 0 – 9 scale previously mentioned. Cross section, roadside drainage, and dust are rated on the same 0 – 3 scale described for asphalt pavement. The governing distress is then determined and the RSL associated with that distress is assigned to the road segment.

Condition Descriptions by Surface Type

The following definitions are used to describe pavement condition for the various surface types. These are general guidelines for condition indications.

Asphalt

Excellent – Recently constructed or overlaid road where construction or overlay was performed correctly- No maintenance required. RSL = 19-20 years.

Good – Low extent longitudinal and transverse cracks. All cracks are 1/4" or less with little or no crack erosion. Patches are in good condition and applied correctly. Routine Maintenance recommended. RSL = 13-18 years.

Fair - Roads are in good structural condition with little or no fatigue cracking. Longitudinal, transverse, and edge cracking is at medium extent and severity. Block cracking is not extensive. Any patches are in good condition. Preventative maintenance recommended. RSL = 7-12 years.

Poor - Road beginning to show signs of structural distress. Fatigue cracking is medium to high extent and medium severity. Cracking will be severe. Surface may have severe block cracking and show. Patches are in fair to poor condition. There is moderate distortion or rutting and occasional potholes. Rehabilitation recommended. RSL = 1-6 years.

Failed - Road is severely deteriorated. Signs of structural failure appear along with severe and extensive fatigue cracking, distortion, potholes, or extensive patches in poor condition. Reconstruction recommended. RSL = 0 years.

Concrete

Excellent - New pavement. No maintenance required. RSL = 19-20 years

Good - First signs of transverse cracking, patch or repair, more extensive pop-outs, or scaling. Sealing or routine maintenance recommended. RSL = 13-18 years.

Fair – Pavement has joint or crack spalling, and/or faulting, along with cracking at corners with broken pieces. Any Patches are in fair condition and faulting is at a minimum. Preventative maintenance recommended. RSL = 7-12 years.

Poor - Joints and cracks are open 1 inch, spalled, or patched. Faulting is more severe. Rehabilitation recommended. RSL = 1-6 years.

Failed - Most slabs have failed structurally, and faulting is severe. Reconstruction recommended. RSL = 0 years.11-9

The following table shows the relationship between RSL and condition.

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE (Asphalt and Concrete Pavements)								
	FAILED	POOR		FAIR		GOOD		EXCELLENT
RSL Years	0	1-3	4-6	7-9	10-12	13-15	16-18	19-20

Gravel and Native

Note - Native surfaces do not have a gravel layer.

Excellent - Newly constructed road that has been constructed properly with proper crown, drainage and gravel layer. Little or no distress. No maintenance recommended. RSL = 8-10 years.

Good - Crown, drainage provisions, and gravel layer are in good condition. Distress limited to traffic effects such as dust, loose aggregate, and low severity corrugations (wash boarding). RSL = 5-7 years.

Fair - Adequate drainage and crown through majority of roadway. Crown repair, ditch improvement may be necessary. Road has more severe corrugations and potholes. Preventative maintenance recommended. RSL = 3-4 years.

Poor - Travel at slow speeds is necessary. Additional gravel layer needed to carry traffic. Poor crown. Ditching is inadequate and rutting is extensive and severe. Rehabilitation recommended. RSL = 1-2 years.

Failed - Travel is difficult, and road may be closed at times. Rutting and Corrugations are very severe. Total Reconstruction of road is recommended. RSL = 0 years.

The following table shows the RSL values for gravel and native roads in terms of excellent, good, fair, poor, and failed condition.

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE (Gravel and Native Surfaces)					
	FAILED	POOR	FAIR	GOOD	EXCELLENT
RSL Years	0	1-2	3-4	5-7	8-10

NATIVE PRIMITIVE/IMPROVED RATING SHEET

Cross Section (Crown)*

Severity	Condition		Description
	No Defects	0	Crown 4-6" with no restriction of water flow from centerline to ditch.
	Minor Defects	1	Inadequate or inconsistent crown. Drainage to ditch may be restricted.
	Moderate Defects	2	Flat crown, drainage to ditch restricted.
	Major Defects	3	Reverse crown, bowl-shaped road, drainage on roadway

Rutting

Severity	Extent (Length)			
	No Defects	Low <10%	Med 10-30%	High >30%
	Low < 6"	1	2	3
	Med 6-12"	4	5	6
	High > 12"	7	8	9

Roadside Drainage*

Severity	Condition		Description
	No Defects	0	Wide, deep ditches (>4') with no restriction to water flow.
	Minor Defects	1	Adequate ditches (>2' deep), minor obstructions restrict water flow.
	Moderate Defects	2	Shallow, narrow and obstructed ditches. Minor erosion of road.
	Major Defects	3	No ditch, drainage on roadway with moderate to severe erosion.

Potholes

Severity	Extent (Area)			
	No Defects	Low <10%	Med 10-30%	High >30%
	Low < 6"	1	2	3
	Med 6-12"	4	5	6
	High > 12"	7	8	9

Dust

Severity	Condition		Description
	No Defects	0	No obstruction to sight distance.
	Minor Defects	1	Sight distance > 550'
	Moderate Defects	2	Sight distance 225'-550'
	Major Defects	3	Sight distance < 225'

Corrugations

Severity	Extent (Length)			
	No Defects	Low <10%	Med 10-30%	High >30%
	Low < 3"	1	2	3
	Med 3-6"	4	5	6
	High > 6"	7	8	9

* Crown and Drainage are not rated for roads that have no constructed crown or drainage. This applies to Native and Gravel roads.

GRAVEL RATING SHEET

Cross Section (Crown)

Severity	Condition		Description
	No Defects	0	Crown 4-6" with no restriction of water flow from centerline to ditch.
	Minor Defects	1	Inadequate or inconsistent crown. Drainage to ditch may be restricted.
	Moderate Defects	2	Flat crown, drainage to ditch restricted.
	Major Defects	3	Reverse crown, bowl-shaped road, drainage on roadway

Rutting

Severity	Extent (Length)			
	No Defects	Low <10%	Med 10-30%	High >30%
	Low < 1"	1	2	3
	Med 1-3"	4	5	6
	High > 3"	7	8	9

Roadside Drainage

Severity	Condition		Description
	No Defects	0	Wide, deep ditches (>4') with no restriction to water flow.
	Minor Defects	1	Adequate ditches (>2' deep), minor obstructions restrict water flow.
	Moderate Defects	2	Shallow, narrow and obstructed ditches. Minor erosion of road.
	Major Defects	3	No ditch, drainage on roadway with moderate to severe erosion.

Potholes

Severity	Extent (Area)			
	No Defects	Low <10%	Med 10-30%	High >30%
	Low < 1"	1	2	3
	Med 1-3"	4	5	6
	High > 3"	7	8	9

Dust

Severity	Condition		Description
	No Defects	0	No obstruction to sight distance.
	Minor Defects	1	Sight distance > 550'
	Moderate Defects	2	Sight distance 225'-550'
	Major Defects	3	Sight distance < 225'

Corrugations

Severity	Extent (Length)			
	No Defects	Low <10%	Med 10-30%	High >30%
	Low < 2"	1	2	3
	Med 2-4"	4	5	6
	High > 4"	7	8	9

* Crown and Drainage are not rated for roads that have no constructed crown or drainage. This applies to Native and Gravel roads.

Loose Aggregate

Severity	Extent (Area)			
	No Defects	Low <10%	Med 10-30%	High >30%
	Low < 1"	1	2	3
	Med 1-3"	4	5	6
	High > 3"	7	8	9

ASPHALT RATING SHEET

Fatigue Cracking

Severity	Extent			
	No Defects	Low 1 crack WP	Med 2 cracks WP	High >30% length
	Low-Cracks < 1/4"	1	2	3
	Med-Cracks 1/4-3/4"	4	5	6
	High-Cracks > 3/4"	7	8	9

Edge Cracking

Severity	Extent (Length)			
	No Defects	Low <10%	Med 10-30%	High >30%
	0-6" from curb	1	2	3
	6-18" from curb	4	5	6
	> 18" from curb	7	8	9

Longitudinal Cracking

Severity	Extent			
	No Defects	Low 1 crack full length	Med 2 cracks full length	High >2 cracks full length
	Low-Cracks < 1/4"	1	2	3
	Med-Cracks 1/4-3/4"	4	5	6
	High-Cracks > 3/4"	7	8	9

Block Cracking

Severity	Extent (Length)			
	No Defects	Low > 15x15' squares	Med 15-10' squares	High <10x10' squares
	Low-Cracks < 1/4"	1	2	3
	Med-Cracks 1/4-3/4"	4	5	6
	High-Cracks > 3/4"	7	8	9

Transverse Cracking

Severity	Extent (ft between cracks)			
	No Defects	Low > 200'	Med 200-50'	High < 50'
	Low-Cracks < 1/4"	1	2	3
	Med-Cracks 1/4-3/4"	4	5	6
	High-Cracks > 3/4"	7	8	9

Utility Cuts

Severity	Extent (Length)			
	No Defects	Low <10%	Med 10-30%	High >30%
	Low-Cracks < 1/4"	1	2	3
	Med-Cracks 1/4-3/4"	4	5	6
	High-Cracks > 3/4"	7	8	9

Drainage/Roughness/Rutting

Severity	Condition		Description
	No Defects	0	Wide, deep ditches with no obstructions, smooth ride, no rutting, no potholes.
	Minor Defects	1	Drainage may be obstructed, < 1" rutting, minor roughness.
	Moderate Defects	2	Poor drainage, 1-2" rutting, noticeable roughness, potholes < 6" wide.
	Major Defects	3	No drainage; > 2" rutting; potholes 6-12" wide create roughness requiring reduced speeds.

CONCRETE RATING SHEET

Spalling of Joints

Extent (% joints)				
No Defects	Low <10%	Med 10-20%	High >20%	
Severity	Low Spalls < 3"	1	2	3
	Med Spalls 3-6"	4	5	6
	High Spalls > 6"	7	8	9

Broken Slabs

Extent (% slabs)				
No Defects	Low <5%	Med 5-15%	High >15%	
Severity	Low-no more than 3 pieces, no spalling/faulting	1	2	3
	Med-broken into >3 pieces, spalling/faulting <1/4"	4	5	6
	High-4 or more pieces, spalling/faulting >1/4"	7	8	9

Transverse Cracks

Extent (% slabs)				
No Defects	Low <10%	Med 10-20%	High >20%	
Severity	Low-Cracks < 1/8"; no spalling/faulting	1	2	3
	Med-Cracks 1/8-1/2"; spall <3", fault >1/4"	4	5	6
	High-Cracks > 1/2"; spall >3", fault >1/4"	7	8	9

Joint Seal Damage

Extent (%joints)				
No Defects	Low <10%	Med 10-20%	High >20%	
Severity	Low <10% joint length	1	2	3
	Med 10-50% joint length	4	5	6
	High >50% joint length	7	8	9

Faulting

Extent (Length)				
No Defects	Low <10%	Med 10-30%	High >30%	
Severity	Low < 1/2"	1	2	3
	Med 1/2-1"	4	5	6
	High > 1"	7	8	9

Patch Deterioration

Extent (Area)				
No Defects	Low <10%	Med 10-30%	High >30%	
Severity	Low-no fault, no settle at perimeter	1	2	3
	Med-fault & settle <1/4" at perimeter	4	5	6
	High-fault & settle >1/4" at perimeter, cracked patch	7	8	9

Corner Breaks

Extent (% of slabs)				
No Defects	Low <10%	Med 10-20%	High >20%	
Severity	Low-corner cracks, no spalling or faulting	1	2	3
	Med-crack slightly spalled & faulted <1/4"	4	5	6
	High-crack highly spalled & faulted >1/4"	7	8	9

Longitudinal Cracks

Extent (% slabs)				
No Defects	Low <10%	Med 10-20%	High >20%	
Severity	Low-Cracks < 1/8"; no spalling/faulting	1	2	3
	Med-Cracks 1/8-1/2"; spall <3", fault >1/2"	4	5	6
	High-Cracks > 1/2"; spall >3", fault >1/2"	7	8	9

Map Cracks

Extent (Area)				
No Defects	Low <10%	Med 10-20%	High >20%	
Severity	Low-small connected cracks, no spalling	1	2	3
	Med-connected cracks, no spalling	4	5	6
	High-large connected cracks with surface spalling	7	8	9

Deficiency Ratings With Associated Remaining Service Life

Asphalt Rating Sheet

Fatigue Cracking		Edge Cracking		Transverse Cracking		Utility Cuts	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	20	0	20	0	20	0	20
1	10	1	12	1	14	1	14
2	8	2	10	2	12	2	12
3	6	3	8	3	10	3	10
4	8	4	10	4	12	4	12
5	6	5	8	5	10	5	10
6	4	6	6	6	8	6	8
7	6	7	8	7	10	7	10
8	2	8	6	8	6	8	6
9	0	9	4	9	2	9	2

Longitudinal Cracking		Block Cracking		Drainage/Roughness/Rutting	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	20	0	20	0	20
1	14	1	12	1	16
2	12	2	10	2	10
3	10	3	8	3	4
4	12	4	10		
5	10	5	8		
6	8	6	6		
7	10	7	12		
8	8	8	6		
9	6	9	2		

Concrete Rating Sheet

Spalling		Broken Slabs		Transverse Cracks	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	20	0	20	0	20
1	15	1	15	1	18
2	12	2	12	2	15
3	10	3	10	3	12
4	12	4	12	4	15
5	10	5	10	5	10
6	8	6	8	6	6
7	10	7	10	7	10
8	6	8	6	8	4
9	0	9	0	9	0

Joint Seal Damage		Faulting		Patch Deterioration	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	20	0	20	0	18
1	16	1	15	1	16
2	14	2	12	2	14
3	12	3	10	3	12
4	14	4	12	4	12
5	10	5	8	5	10
6	8	6	6	6	8
7	12	7	10	7	10
8	8	8	4	8	6
9	6	9	0	9	0

Corner Breaks		Longitudinal Cracks		Map Cracks	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	18	0	20	0	20
1	16	1	18	1	18
2	14	2	15	2	15
3	12	3	12	3	12
4	12	4	15	4	12
5	10	5	10	5	10
6	8	6	6	6	6
7	10	7	10	7	10
8	6	8	4	8	4
9	0	9	0	9	0

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE IN YEARS (Asphalt & Concrete Roads)

RSL	FAILED 0	POOR 1 - 6	FAIR 7 - 12	GOOD 13 - 18	EXCELLENT 19 - 20
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Deficiency Ratings With Associated Remaining Service Life

Native Primitive Improved Rating Sheet

Cross Section		Rutting		Roadside Drainage	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	10	0	10	0	10
1	7	1	9	1	8
2	5	2	7	2	4
3	0	3	5	3	0
		4	7		
		5	4		
		6	3		
		7	4		
		8	2		
		9	0		

Potholes		Dust		Corrugations	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	10	0	10	0	10
1	9	1	8	1	9
2	7	2	6	2	7
3	5	3	2	3	7
4	7			4	6
5	4			5	5
6	3			6	5
7	4			7	4
8	2			8	3
9	0			9	0

Gravel Rating Sheet

Cross Section		Rutting		Roadside Drainage	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	10	0	10	0	10
1	7	1	9	1	8
2	5	2	7	2	4
3	0	3	5	3	0
		4	7		
		5	4		
		6	3		
		7	4		
		8	2		
		9	0		

Potholes		Dust		Corrugations	
Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life	Distress Rating	Remaining Service Life
0	10	0	10	0	10
1	9	1	8	1	9
2	7	2	6	2	7
3	5	3	2	3	7
4	7			4	6
5	4			5	5
6	3			6	5
7	4			7	4
8	2			8	3
9	0			9	0

Loose Aggregate	
Distress Rating	Remaining Service Life
0	10
1	9
2	8
3	7
4	8
5	7
6	6
7	5
8	3
9	0

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE IN YEARS (Gravel & Native Roads)

RSL	FAILED	POOR	FAIR	GOOD	EXCELLENT
	0	1 - 2	3 - 4	5 - 7	8 - 10